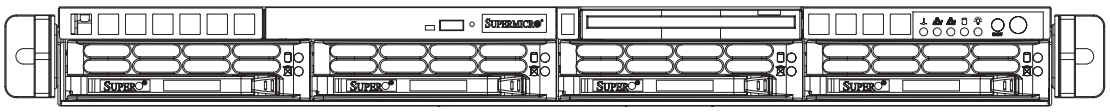
# A+ Server 1020A-T



# USER'S MANUAL

1.0

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# Preface

## About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the A+ Server 1020A-T. Installation and maintainance should be performed by experienced technicians only.

The 1020A-T is a high-end 1U rackmount server based on the SC813T+-500 server chassis and the H8DAR-T serverboard, which supports single or dual AMD Opteron™ 200 series processors and up to 16 GB of DDR400/333 or 32 GB of DDR266 SDRAM memory.

## Manual Organization

### Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the H8DAR-T serverboard and the SC813T+-500 chassis, which make up the 1020A-T.

### Chapter 2: Server Installation

This chapter describes the steps necessary to install the 1020A-T into a rack and check out the server configuration prior to powering up the system. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

### Chapter 3: System Interface

Refer here for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

### Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the 1020A-T.

### Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the H8DAR-T serverboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

### Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC813T+-500 1U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring Serial ATA or peripheral drives and when replacing the system power supply unit and cooling fans.

### Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

### Appendix A: BIOS POST Messages

### Appendix B: BIOS POST Codes

### Appendix C: Software Installation

### Appendix D: System Specifications

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# Notes

# Chapter 1

# Introduction

## 1-1 Overview

The A+ Server 1020A-T is a high-end, dual processor 1U rackmount server system featuring some of the most advanced technology currently available. The 1020A-T is comprised of two main subsystems: the SC813T+-500 1U rackmount chassis and the H8DAR-T dual processor serverboard. Please refer to our web site for information on operating systems that have been certified for use with the 1020A-T. In addition to the mainboard and chassis, various hardware components may have been included with your 1020A-T server system, as listed below:

- One (1) slim floppy drive [FPD-TEAC-S(B)]
- One (1) slim CD-ROM drive [CDM-TEAC-24(B)]
- Two (2) riser cards (CSE-RR1U-X and CSE-RR1U-XLP)
- Two (2) CPU backplates (BKT-0004)
- Two (2) heatsink retention modules with four (4) screws (BKT-0005)
- Four (4) 4-cm high-performance counter-rotating fans (FAN-0083)
- One (1) or two (2) CPU heatsinks (optional, SNK-P0012)
- One (1) air shroud (CSE-PT70)
- Serial ATA (SATA) Accessories:
  One (1) SATA backplane (CSE-SATA-813L)
  Four (4) SATA data cables (CBL-0061)
  Four (4) SATA drive carriers [CSE-PT39(B)]
- Rackmount hardware with screws (CSE-PT51):
  Two (2) rack rail assemblies
  Six (6) brackets for mounting the rack rails to a rack/telco rack
- One (1) CD containing drivers and utilities

Note: a "B" at the end of a part number indicates the item is available in black.

## 1-2 Serverboard Features

At the heart of the 1020A-T lies the H8DAR-T a dual processor serverboard designed to provide maximum performance. The H8DAR-T is based on the AMD 8132/8111 chipset. Below are the main features of the H8DAR-T. See Figure 1-1 for a system block diagram of the chipset.

### Processors

The H8DAR-T supports single or dual 940-pin AMD Opteron™ 200 series processors. Please refer to our web site for a complete listing of supported processors.

### Memory

The H8DAR-T has eight 184-pin DIMM slots that can support up to 32 GB of registered ECC DDR266 or up to 16 GB of registered ECC DDR400/333 SDRAM.

**Note:** The maximum memory capacity is halved if only one processor is installed. Memory is supported in both interleaved and non-interleaved configurations. See Section 5-6 for details.

### Serial ATA

A Marvell 88SX6041 "Hercules II" SATA controller is integrated onboard the H8DAR-T to provide a four-port Serial ATA subsystem, which is RAID 0 and 1 supported. The Serial ATA drives are hot-swappable units.

**Note:** The operating system you use must have RAID support to enable the hot-swap capability and RAID function of the Serial ATA drives.

### PCI Expansion Slots

Two riser cards have been included with the server to support add-on PCI expansion cards. The CSE-RR1U-X riser fits into the 133 MHz PCI-X #6 slot on the H8DAR-T to support a full-height, half-length PCI-X add-on card. The CSE-RR1U-XLP fits into the 133 MHz PCI-X #7 slot to support one low profile PCI-X add-on card.

## ATI Graphics Controller

An ATI video controller based on the Rage XL 8 MB graphics chip is integrated onboard the H8DAR-T. Rage XL fully supports sideband addressing and AGP texturing. This onboard graphics package can provide a bandwidth of up to 512 MB/sec over a 32-bit graphics memory bus.

## Onboard Controllers/Ports

The H8DAR-T provides one floppy drive controller and two onboard IDE controllers, which support up to four hard drives or ATAPI devices. Backpanel I/O ports include one COM port, two USB ports, PS/2 mouse and keyboard ports and a video (monitor) port. A Broadcom BCM5704 Ethernet controller is also included to support two Gb LAN ports.

## Other Features

Other onboard features are included to promote system health. These include various voltage monitors, two CPU temperature sensors, fan speed sensors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.

# 1-3 Server Chassis Features

The SC813T+-500 is our third-generation 1U chassis and features four hot-swap Serial ATA drive bays, a slim CD-ROM drive, a slim 3.5" floppy drive and a revolutionary cooling design that can keep today's most powerful processors running well below their temperature thresholds. The following is a general outline of the main features of the SC813T+-500 chassis.

## System Power

The SC813T+-500 chassis includes a single 500W cold-swap power supply.

## Serial ATA Subsystem

For the 1020A-T, the SC813T+-500 chassis was designed to support four Serial ATA hard drives, which are hot-swappable units. RAID 0 and RAID 1 levels are supported.

**Note:** The system's operating system must have RAID support to enable the hot-swap capability of the Serial ATA drives.

## Control Panel

The control panel provides important system monitoring and control information. LEDs indicate power on, network activity, hard disk drive activity and system overheat conditions. Also present are main power and system reset buttons.

## I/O Backplane

The SC813T+-500 is a 1U rackmount chassis. Its I/O backplane provides one full-height, half-length and one low profile slot for PCI add-on cards, one COM port (the other is internal), one VGA port, two USB ports, PS/2 mouse and keyboard ports and two Ethernet (LAN) ports. (See Figure 1-2.)

## Cooling System

The SC813T+-500 chassis' revolutionary cooling design has been optimized to provide sufficient cooling for dual processor configurations. The chassis includes four counter-rotating 4-cm fans located in the middle of the chassis. In the event of a fan failure, the ambient air temperature inside the chassis will rise and activate an overheat LED (fan speed is controlled by the system temperature).

A fan speed control setting in BIOS allows chassis fan speed to be determined by system temperature [recommended setting is 3-pin (Server)].

**Figure 1-1. AMD 8132/8111 Chipset: System Block Diagram**

**Note:** This is a general block diagram. Please see Chapter 5 for details.

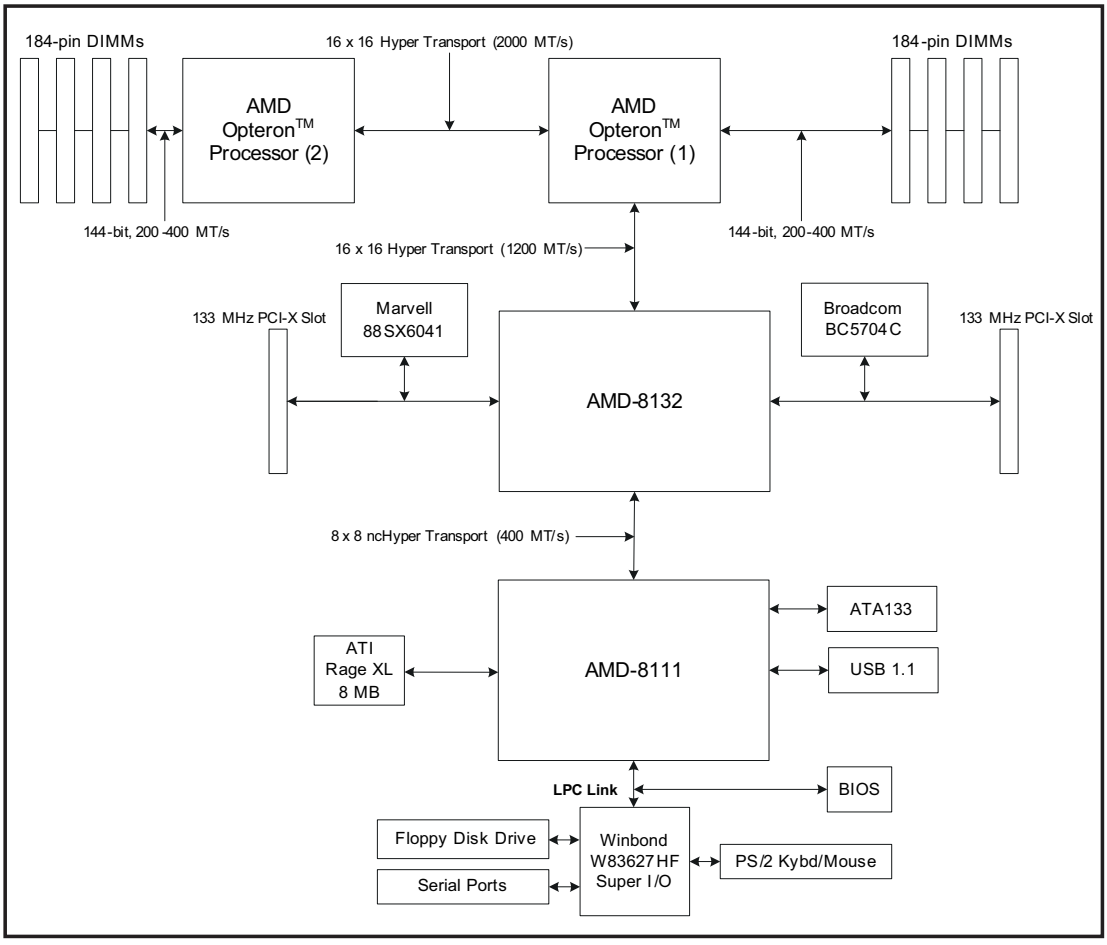
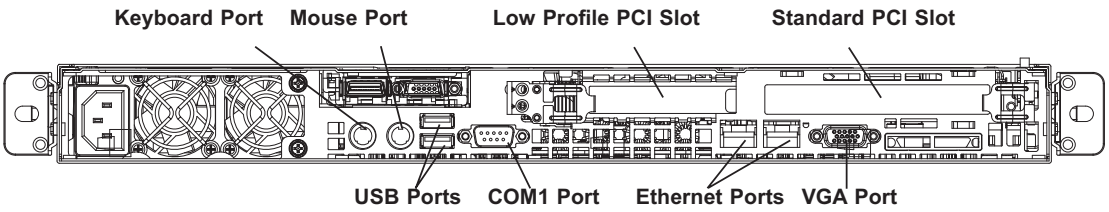


**Figure 1-2. I/O Backplane**



# Chapter 2

# Server Installation

## 2-1 Overview

This chapter provides a quick setup checklist to get your A+ 1020A-T system up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your 1020A-T system has come to you with the processors and memory preinstalled. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

## 2-2 Unpacking the System

You should inspect the box the 1020A-T was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the 1020A-T. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

## 2-3 Preparing for Setup

The box the 1020A-T was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

## Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches).
- Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.
- This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

## Warnings and Precautions!

## Rack Precautions

• Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
• In single rack installation, stabilizers should be attached to the rack.
• In multiple rack installations, the racks should be coupled together.
• Always make sure the rack is stable before extending a component from the rack.
• You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

## Server Precautions

• Review the electrical and general safety precautions in Chapter 4.
• Determine the placement of each component in the rack *before* you install the rails.
• Install the heaviest server components on the bottom of the rack first, and then work up.
• Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
• Allow the hot plug Serial ATA drives and power supply units to cool before touching them.
• Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

## Rack Mounting Considerations

### Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

### Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

### Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

### Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

### Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

## 2-4 Installing the System into a Rack

This section provides information on installing the 1020A-T into a rack unit with the rack rails provided. If the 1020A-T has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

### Identifying the Sections of the Rails

You should have received a rack mounting kit with the 1020A-T. The kit includes two sets of chassis rails (four pieces total, two of which are already installed on the chassis) and two sets of rack rails (four pieces total). Figure 2-1 displays the two right-side chassis rails and the two right-side rack rails. Note that two of the four chassis rails (Chassis Rail 1) are already attached to the chassis.

### Installing the Rack Rails

Begin by joining one set of rack rails corresponding to either the left or the right side of the rack. Do this by aligning the studs of one rail with the holes of the other rail. Push the studs into the grooved holes and then push the rail to slide the studs to the end of the groove. Repeat this with the rack rails used for the other side. Next, determine where you want to place the 1020A-T in the rack. (See Rack and Server Precautions in Section 2-3.) Position the assembled rack rails at the desired location in the rack. Screw the assembly securely to the rack using the brackets provided. Attach the other assembly to the other side of the rack, making sure both are at the exact same height and with the rail guides facing inward.

**Locking Tabs:** Both of the two chassis rails on each side have a locking tab (four total), which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal operating position. Secondly, these tabs also lock the server in place when extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing. The two sets of locking tabs mean there are two locked positions when the chassis is extended from the rack, allowing easy access when servicing the system. Note that on one side, you push the locking tab up to release it and on the other side you push it down to release.

## Installing the Chassis Rails

Two of the chassis rails (Chassis Rail 1) should have already been preattached - one to each side of the chassis. Attach the second set of chassis rails (Chassis Rail 2) directly to the chassis with the screws provided. Chassis Rail 2 should be positioned just behind Chassis Rail 1 (see Figure 2-2). Do this for both sides of the chassis.

**Figure 2-1. Identifying the Sections of the Rails**

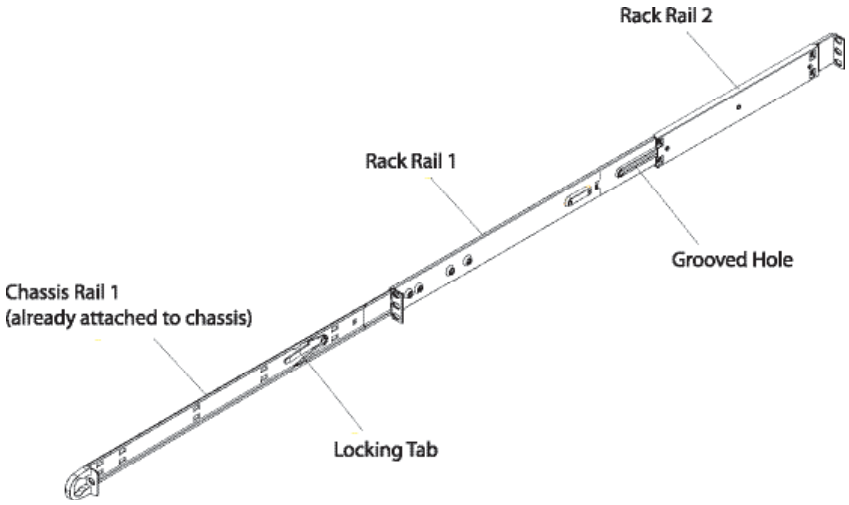
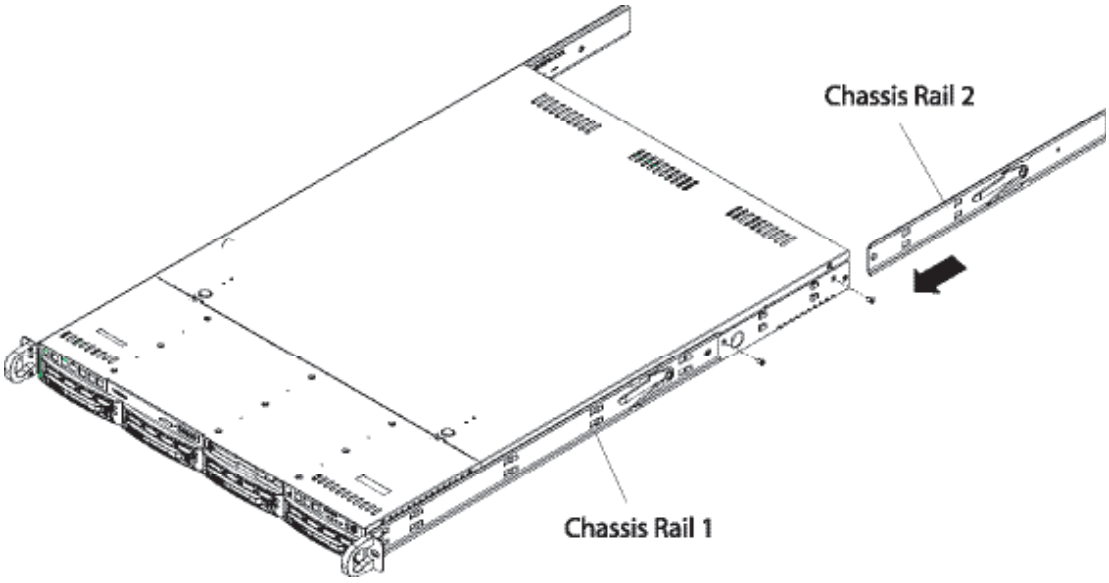



**Figure 2-2. Installing Chassis Rails**

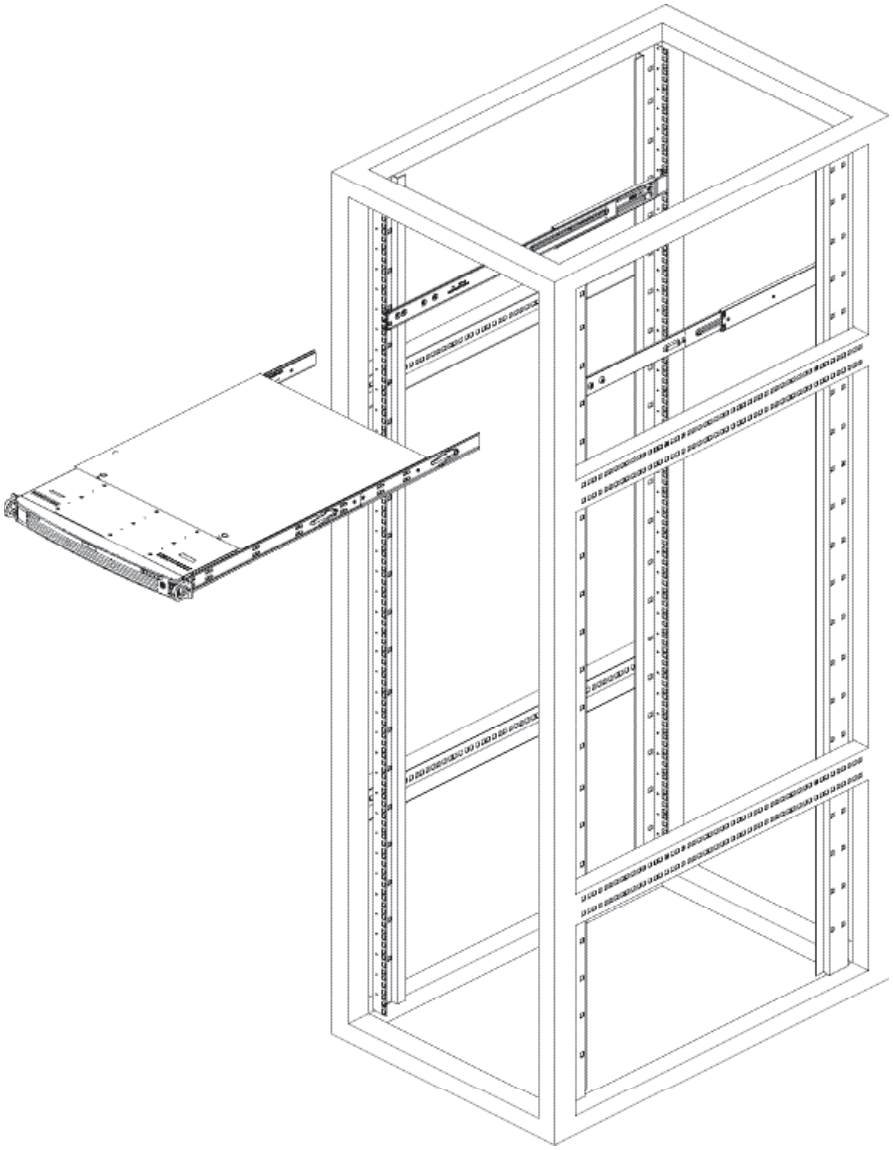


## Installing the Server into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack. Do this by lining up the rear of the chassis rails with the front of the rack rails. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). See Figure 2-3.

When the server has been pushed completely into the rack, you should hear the locking tabs "click". Finish by inserting and tightening the thumb screws that hold the front of the server to the rack.

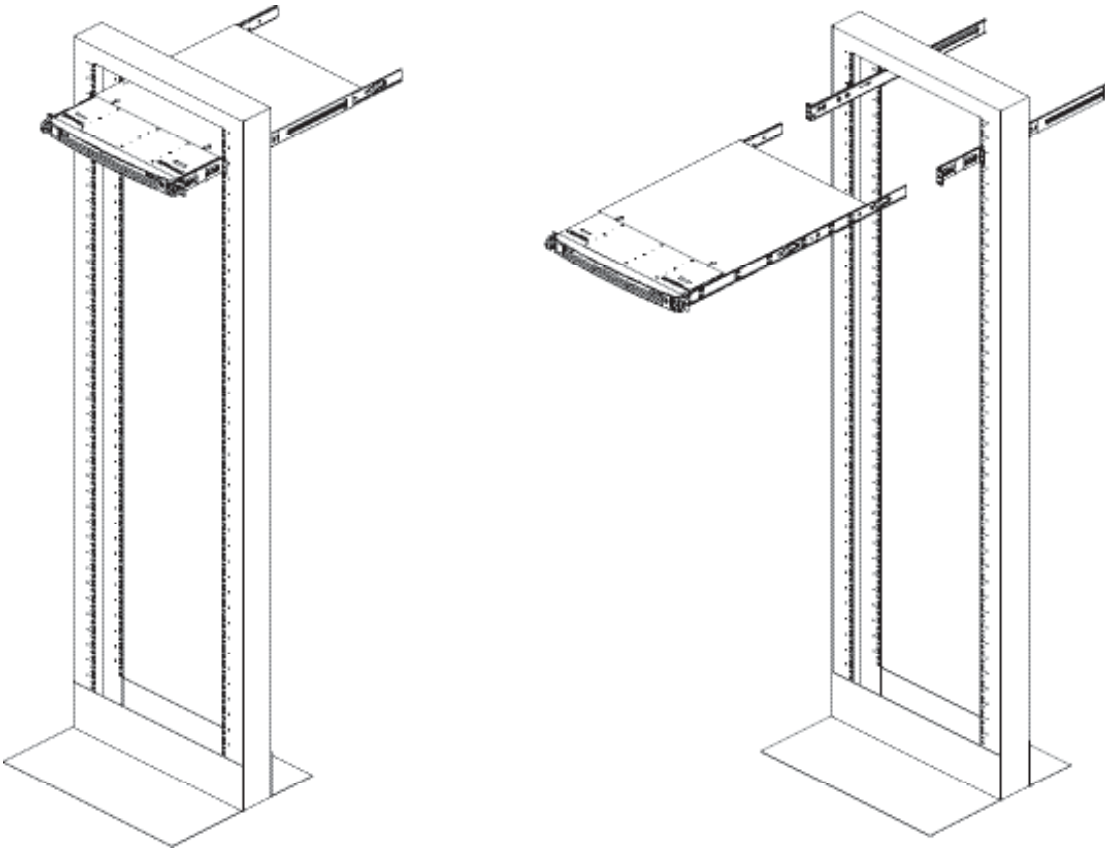
**Figure 2-3. Installing the Server into a Rack**



## Installing the Server into a Telco Rack

If you are installing the 1020A-T into a Telco type rack, follow the directions given on the previous pages for rack installation. The only difference in the installation procedure will be the positioning of the rack brackets to the rack. They should be spaced apart just enough to accommodate the width of the telco rack.

**Figure 2-4. Installing the Server into a Telco Rack**



## 2-5 Checking the Serverboard Setup

After you install the A+ 1020A-T in the rack, you will need to open the unit to make sure the serverboard is properly installed and all the connections have been made.

1. **Accessing the inside of the 1020A-T (see Figure 2-5)**
   First, release the retention screws that secure the unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover. There is a large rectangular recess in the middle front of the top cover to help you push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server.

2. **Check the CPUs (processors)**
   You should have one or two processors already installed into the serverboard. Each processor needs its own heatsink. See Chapter 5 for instructions on processor and heatsink installation.

3. **CPU Speed**
   The CPU speed should automatically be detected so you will not need to change any jumpers or settings in the BIOS Setup utility.

4. **Check the system memory**
   Your 1020A-T server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 5.

5. **Installing add-on cards**
   If desired, you can install add-on cards to the system. See Chapter 5 for details on installing PCI add-on cards.

6. **Check all cable connections and airflow**
   Make sure all power and data cables are properly connected and not blocking the chassis airflow. See Chapter 5 for details on cable connections.

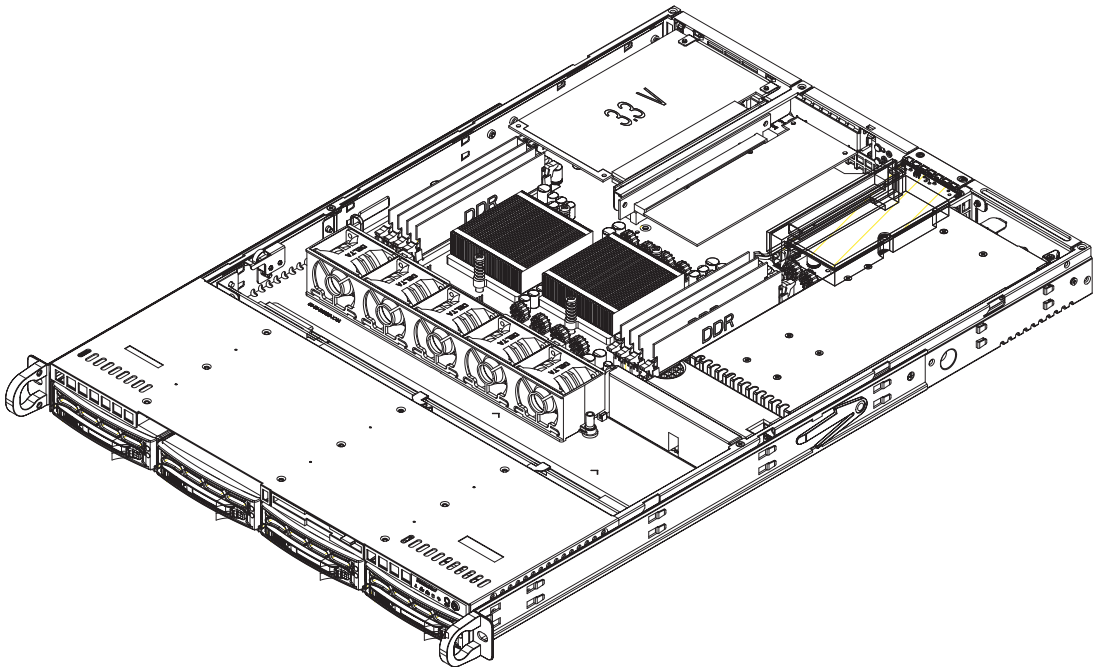



**Figure 2-5. Accessing the Inside of the A+ 1020A-T**

## 2-6 Checking the Drive Bay Setup

Next, you should check to make sure the peripheral drives and the Serial ATA drives have been properly installed and all connections have been made.

1. **Accessing the drive bays**
   All drives are accessable from the front of the server. For servicing the CD-ROM and floppy drives, you will need to remove the top chassis cover. The Serial ATA disk drives can be installed and removed from the front of the chassis without removing the top chassis cover or powering down the system.

2. **CD-ROM and floppy disk drives**
   A slim CD-ROM and a floppy drive should be preinstalled in your server. Refer to Chapter 6 if you need to reinstall a CD-ROM and/or floppy disk drive to the system.

3. **Check the SATA disk drives**
   Depending upon your system's configuration, your system may have one or more drives already installed. If you need to install Serial ATA drives, please refer to Chapter 6.

**4. Check the airflow**

Airflow is provided by four sets of counter-rotating 4-cm fans. The system component layout was carefully designed to direct the airflow to the components that generate the most heat. Note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

**5. Supplying power to the system**

The last thing you must do is to provide power to the system. Plug the power cord from the power supply module into a high-quality power strip that offers protection from electrical noise and power surges. It is recommended that you use an uninterruptible power supply (UPS). Finish by depressing the power button on the front of the chassis to start the system.

# Chapter 3

# System Interface

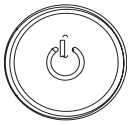
## 3-1 Overview

There are several LEDs on the control panel as well as others on the Serial ATA drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the chassis control panel and an on/off switch on the power supply. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

## 3-2 Control Panel Buttons

There are two push-buttons located on the front of the chassis. These are (in order from left to right) a reset button and a power on/off button.

- **Reset:** Use the reset switch to reboot the system.



- **Power:** The main power switch is used to apply or remove power from the power supply to the server system. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

## 3-3 Control Panel LEDs

The control panel located on the front of th SC813T+-500 chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

- **Overheat/Fan Fail:** When this LED flashes it indicates a fan failure. When on continuously (on and not flashing) it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly (see Chapter 5). This LED will remain flashing or on as long as the overheat condition exists.

- **NIC2:** Indicates network activity on GLAN2 when flashing .

- **NIC1:** Indicates network activity on GLAN1 when flashing.

- **HDD:** Indicates IDE channel activity. On the 1020A-T this light indicates SATA and/or CD-ROM drive activity when flashing.

- **Power:** Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

## 3-4 Serial ATA Drive Carrier LED

Each Serial ATA drive carrier has a green LED. When illuminated, this green LED (on the front of the Serial ATA drive carrier) indicates drive activity. A connection to the Serial ATA backplane enables this LED to blink on and off when that particular drive is being accessed.

**Note:** The second LED on the SATA carriers is not used.

# Notes

# Chapter 4

# System Safety

## 4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the 1020A-T from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.

- Do not work alone when working with high voltage components.

- Power should always be disconnected from the system when removing or installing main system components, such as the serverboard, memory modules and the CD-ROM and floppy drives (not necessary for Serial ATA drives). When disconnecting power, you should first power down the system with the operating system and then unplug the power cords from all the power supply modules in the system.

- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.

- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.

- Do not use mats designed to decrease electrostatic discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.

- The power supply power cord must include a grounding plug and must be plugged into grounded electrical outlets.

- Serverboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarities. This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. See Figure 4-1.

- CD-ROM Laser: **CAUTION** - this server may have come equipped with a CD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

## 4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the 1020A-T clean and free of clutter.

- The 1020A-T weighs approximately 38 lbs (17.3 kg) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

## 4-3 ESD Precautions

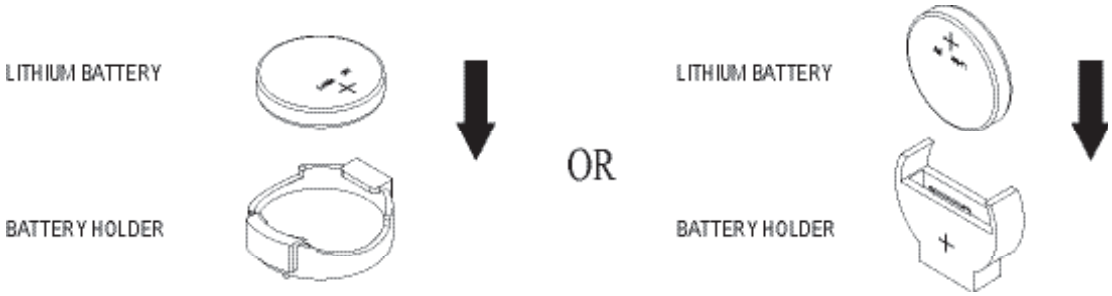
Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

## 4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the 1020A-T is operating to ensure proper cooling. Out of warranty damage to the 1020A-T system can occur if this practice is not strictly followed.

**Figure 4-1. Installing the Onboard Battery**



# Chapter 5

# Advanced Serverboard Setup

This chapter covers the steps required to install processors and heatsinks to the H8DAR-T serverboard, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are described and a layout and quick reference chart are included in this chapter. Remember to close the chassis completely when you have finished working on the serverboard to protect and cool the system sufficiently.

## 5-1 Handling the Serverboard

Static electrical discharge can damage electronic components. To prevent damage to printed circuit boards, it is important to handle them very carefully (see Chapter 4). Also note that the size and weight of the serverboard can cause it to bend if handled improperly, which may result in damage. To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from static discharge.

### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.

### Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

## 5-2 Mounting the Serverboard into a Chassis

All serverboards and motherboards have standard mounting holes to fit different types of chassis. Make sure that the locations of all the mounting holes for both the serverboard and the chassis match. Although a chassis may have both plastic and metal mounting fasteners, metal ones are highly recommended because they ground the serverboard to the chassis. Make sure that the metal standoffs click in or are screwed in tightly.

**1. Check the compatibility of the serverboard ports and the I/O shield**

The H8DAR-T serverboard requires a chassis that can support extended ATX boards of 12" x 13.05" in size, such as the SC813T+-500. Make sure that the I/O ports on the serverboard align with their respective holes in the I/O shield at the rear of the chassis.

**2. Mounting the serverboard onto the mainboard tray in the chassis**

Carefully mount the serverboard onto the mainboard tray by aligning the serverboard mounting holes with the raised metal standoffs in the tray. Insert screws into all the mounting holes in the serverboard that line up with the standoffs. Then use a screwdriver to secure the serverboard to the mainboard tray - tighten until just snug (if too tight you might strip the threads). Metal screws provide an electrical contact to the serverboard ground to provide a continuous ground for the system.

## 5-3 Processor and Heatsink Installation

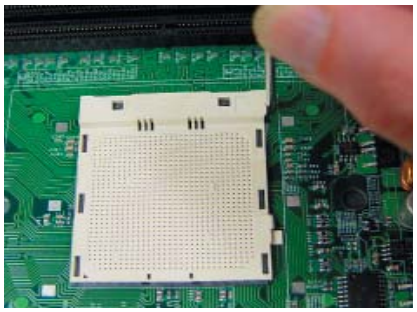
*Exercise extreme caution when handling and installing the processor. Always connect the power cord last and always remove it before adding, removing or changing any hardware components.*

### CPU Backplates

Two CPU backplates (BKT-0004) have been preinstalled to the underside of the serverboard. These backplates prevent the CPU area of the serverboard from bending and provide a base for attaching the CPU heatsinks.

## Installing the Processor (install to the CPU#1 socket first)

1. Lift the lever on CPU socket #1 until it points straight up.



2. Use your thumb and your index finger to hold the CPU. Locate pin 1 on the CPU socket and pin 1 on the CPU. Both are marked with a triangle.

3. Align pin 1 of the CPU with pin 1 of the socket. Once aligned, carefully place the CPU into the socket. *Do not drop the CPU on the socket, move the CPU horizontally or vertically or rub the CPU against the socket or against any pins of the socket, which may damage the CPU and/or the socket*.

4. With the CPU inserted into the socket, inspect the four corners of the CPU to make sure that it is properly installed and flush with the socket.

5. Gently press the CPU socket lever down until it locks in the plastic tab. For a dual-processor system, repeat these steps to install another CPU into the CPU#2 socket.

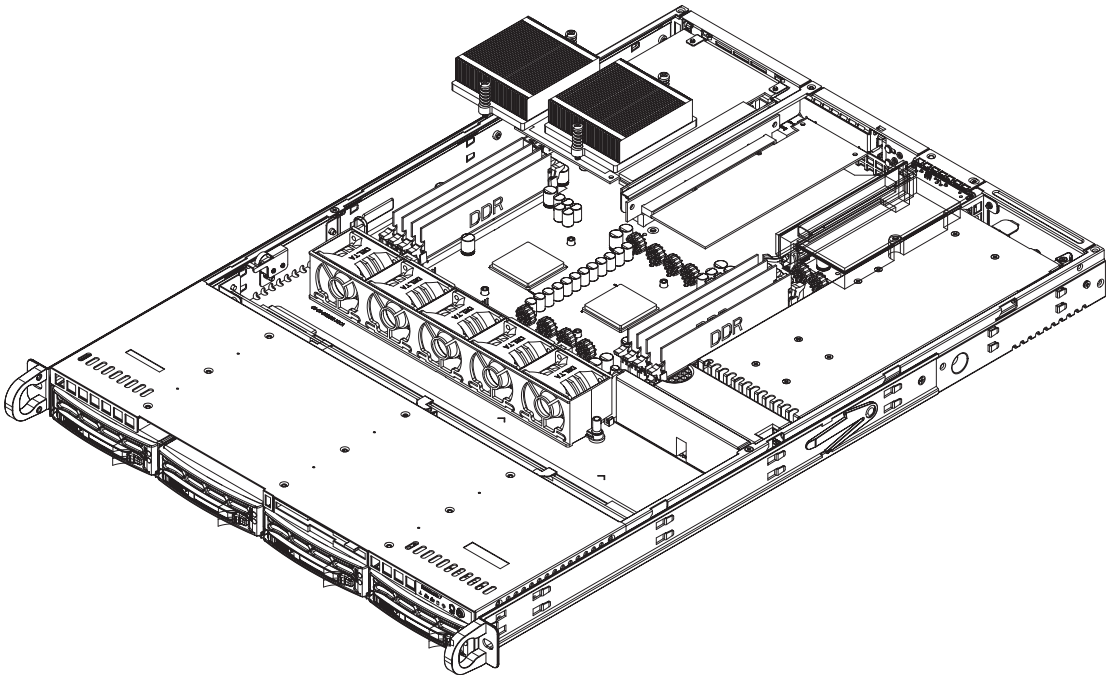
**Note:** if using a single processor, only CPU 1 DIMM slots are addressable.

## Installing the Heatsinks

To install the heatsink (SNK-P0012, optional), do not apply any thermal compound to the heatsink or CPU die - the proper amount has already been applied. Place the heatsink directly on the CPU so that the two mounting holes are aligned with those on the CPU backplate. Make sure the heatsink sits completely flat on the CPU - if not completely flat, the space between the two will degrade the heat dissipation function of the heatsink, which may cause the processor to overheat. Screw in the two screws until just snug (do not fully tighten), then finish by fully tightening both screws (see Figure 5-1).

If installing two processors, repeat these steps to install the second processor in the CPU #2 slot.

**Figure 5-1. Installing Heatsinks**



# 5-4 Connecting Cables

Now that the processors are installed, the next step is to connect the cables to the serverboard. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

## Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed in preconfigured systems to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to reroute them as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). If you are configuring the system, keep the airflow in mind when routing the cables. The following data cables (with their serverboard connector locations noted) should be connected. See the serverboard layout diagram in this chapter for connector locations.

- CD-ROM cable (JIDE#1)
- Floppy Drive cable (JFDD1)
- Serial ATA cables (JS1, JS11, JS12, JS13)
- Control Panel cable (JF1, see next page)

## Connecting Power Cables

The H8DAR-T has a 24-pin primary power supply connector "J1B4" at designated "ATX Power" for connection to the ATX power supply. Connect the appropriate connector from the power supply to the "ATX Power" connector to supply power to the serverboard. See the Connector Definitions section in this chapter for power connector pin definitions.

In addition, your power supply must be connected to the 8-pin Secondary ATX Power connection at JPW2. For systems with high load configurations, a third power connector at J32 should also be connected to your power supply.

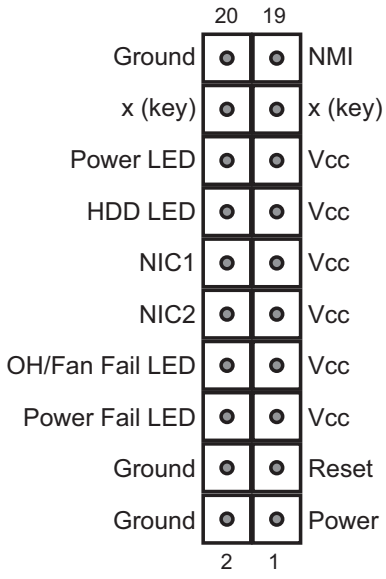
## Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-2 for the pin locations of the various front control panel buttons and LED indicators and refer to section 5-9 for details. Note that even and odd numbered pins are on opposite sides of each header.

All JF1 wires have been bundled into single keyed ribbon cable to simplify their connection. The red wire in the ribbon cable plugs into pin 1 of JF1. Connect the other end of the cable to the Control Panel printed circuit board, located just behind the system status LEDs in the chassis.

See the Connector Definitions section in this chapter for details and pin descriptions of JF1.

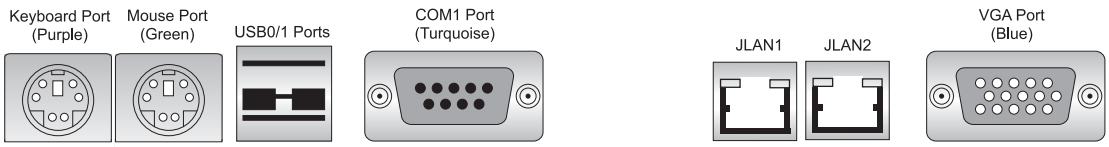
**Figure 5-2. Front Control Panel Header Pins (JF1)**



## 5-5 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-3 below for the colors and locations of the various I/O ports.

**Figure 5-3. Rear Panel I/O Ports**




## 5-6 Installing Memory

***CAUTION***

Exercise extreme care when installing or removing memory modules to prevent any possible damage.

1. Insert each memory module vertically into its slot, paying attention to the notch along the bottom of the module to prevent inserting the module incorrectly (see Figure 5-4). See support information below.

2. Gently press down on the memory module until it snaps into place.

**Note:** each processor has its own built-in memory controller, so CPU2 DIMMs cannot be addressed if only a single CPU is installed. 128 MB, 256 MB, 512 MB, 1 GB, 2 GB* and 4 GB* memory modules are supported.
*With Opteron 246 C-stepping CPUs and above.

**Support**

The H8DAR-T supports single or dual-channel, registered ECC DDR400/333/266 SDRAM.
Both interleaved and non-interleaved memory are supported, so you may populate any number of DIMM slots (see note on previous page). The CPU2 DIMM slots can only be accessed when two CPUs are installed (however, the CPU2 DIMM slots are not required to be populated when two CPUs are installed).

Populating two adjacent slots at a time with memory modules of the same size and type will result in interleaved (128-bit) memory, which is faster than non-interleaved (64-bit) memory.

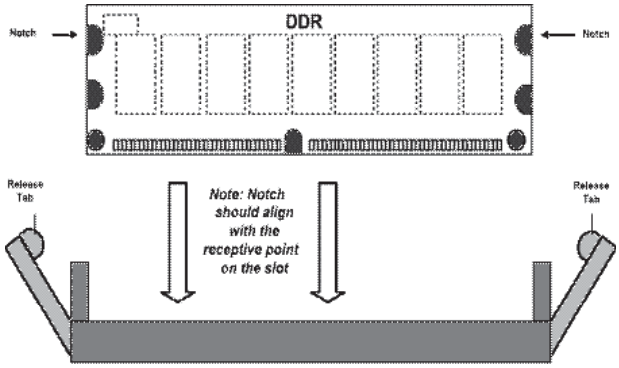
**Optimizing memory performance**

If two processors are installed, it is better to stagger pairs of DIMMs across both sets of CPU DIMM slots, e.g. first populate CPU1 slots 1A and 1B, then CPU2 slots 1A, and 1B, then the next two CPU1 slots, etc. This balances the load over both CPUs to optimize performance.

**Maximum memory (two CPUs)**: 32 GB for DDR266 and 16 GB for DDR400/333. If only one CPU is installed, maximum supported memory capacity is halved (16 GB for DDR266 and 8 GB for DDR400/333).

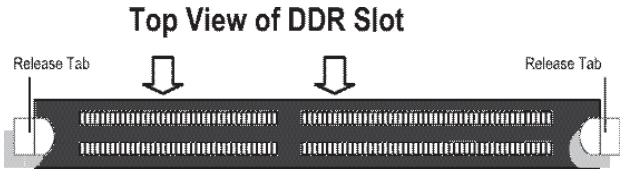
**Figure 5-4. Side and Top Views of DDR Installation**

**To Install:**
Insert module vertically and press down until it snaps into place. The release tabs should close - if they do not you should close them yourself.




Note the notch in the slot and on the bottom of the DIMM. These prevent the DIMM from being installed incorrectly.

**To Remove:**
Use your thumbs to gently push each release tab outward to release the DIMM from the slot.




| Populating Memory Banks for Non-Interleaved (64-bit) Operation | | | | | | | |
|---|---|---|---|---|---|---|---|
| CPU1 DIMM1A | CPU1 DIMM1B | CPU1 DIMM2A | CPU1 DIMM2B | CPU2 DIMM1A | CPU2 DIMM1B | CPU2 DIMM2A | CPU2 DIMM2B |
| X | | | | | | | |
| X | | X | | | | | |
| X | | | | X | | | |
| X | | | | | | X | |
| | | X | | X | | | |
| | | X | | | | X | |

| Populating Memory Banks for Interleaved (128-bit) Operation | | | | | | | |
|---|---|---|---|---|---|---|---|
| CPU1 DIMM1A | CPU1 DIMM1B | CPU1 DIMM2A | CPU1 DIMM2B | CPU2 DIMM1A | CPU2 DIMM1B | CPU2 DIMM2A | CPU2 DIMM2B |
| X | X | | | | | | |
| X | X | | | X | X | | |
| X | X | X | X | | | | |
| X | X | | | X | X | X | X |
| X | X | X | X | X | X | X | X |
| | | X | X | | | X | X |
| | | | | X | X | | |
| | | | | X | X | X | X |
| | | | | X | X | X | X |
| | | | | X | X | X | X |

**Notes:** X indicates a populated DIMM slot. If adding four DIMMs (with two CPUs installed), the configuration in rows 2 and 6 (with DIMMs spread over both CPUs) will result in optimized performance.

## 5-7 Adding PCI Cards

### 1. PCI slots

The H8DAR-T has two PCI-X 133 MHz expansion slots. Two riser cards are included with the server to make both PCI-X slots available in a 1U chassis format: the CSE-RR1U-X riser fits into the PCI-X slot #6 to support a full-height, half-length PCI-X add-on card and the CSE-RR1U-XLP riser fits into the PCI-X slot #7 to support a low profile PCI-X add-on card.

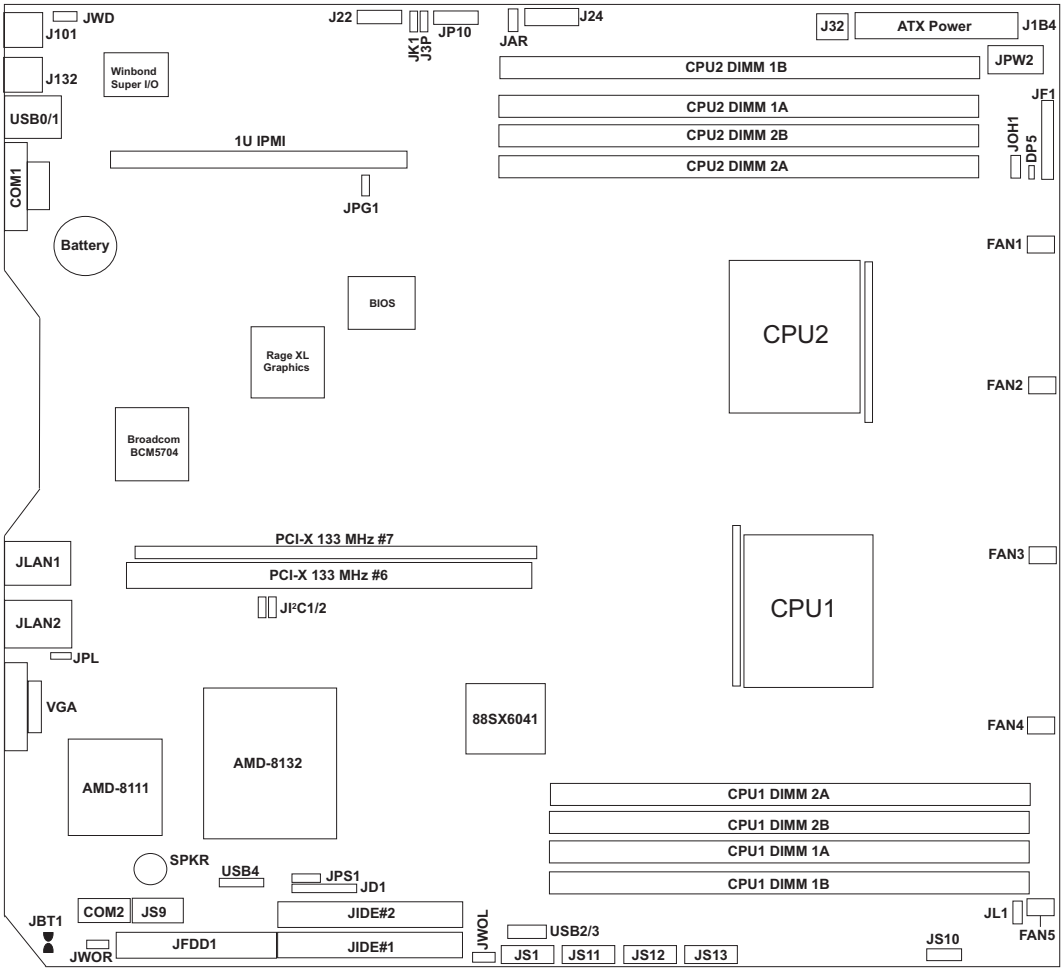
### 2. PCI card installation

Before installing a PCI add-on card, make sure it conforms to the correct riser card (see step 1, above).

Begin by swinging the release tab on the PCI shield that corresponds to the riser card/PCI-X slot you wish to populate. Insert the PCI card into the correct riser card (depending on whether it is a standard or low-profile card), pushing down with your thumbs evenly on both sides of the card. Finish by pushing the release tab back to its original (locked) position. Follow this procedure when adding a card to either slot.

# 5-8 Serverboard Details

**Figure 5-5. H8DAR-T Serverboard Layout**
(not drawn to scale)




**Notes:**

Jumpers not indicated are for test purposes only.

# H8DAR-T Quick Reference

| Jumpers | Description | Default Setting |
|---|---|---|
| J3P | 3rd Power Fail Signal En/Dis | Open (Disabled) |
| JBT1 | CMOS Clear | See Section 2-7 |
| JI²C1/2 | I²C to PCI Enable/Disable | Closed (Enabled) |
| JPG1 | VGA Enable/Disable | Pins 1-2 (Enabled) |
| JPL | JLAN1/JLAN2 En/Disable | Pins 1-2 (Enabled) |
| JPS1 | SATA Enable/Disable | Pins 1-2 (Enabled) |
| JWD | Watch Dog | Pins 1-2 (Reset) |

| Connectors | Description |
|---|---|
| 1U IPMI | IPMI 2.0 Socket |
| COM1, COM2 | COM1/COM2 Serial Port/Header |
| DP5 | Onboard +3.3V Power LED |
| FAN 1-5 | System Fan Headers |
| J22 | System Management Bus Header |
| J32 | 4-Pin Auxiliary Power Connector |
| J101 | PS/2 Keyboard Port |
| J132 | PS/2 Mouse Port |
| J1B4 | 24-Pin ATX Power Connector |
| JAR | Power Supply Alarm Reset Header |
| JD1 | Internal Speaker (Buzzer) Enable/Power LED Header |
| JF1 | Front Panel Connector |
| JFDD1 | Floppy Disk Drive Connector |
| JIDE#1/JIDE#2 | IDE#1/IDE#2 Connectors |
| JK1 | Keylock Header |
| JL1 | Chassis Intrusion Header |
| JLAN1/2 | Gigabit Ethernet (RJ45) Ports |
| JOH1 | Overheat Warning Header |
| JP10 | Power Fail and Alarm Reset Header |
| JPW2 | 8-Pin Power Connector |
| JS1, JS11, JS12, JS-13 | Serial ATA Connectors |
| JS9 | Serial ATA Activity LED Header |
| JS10 | SATA I²C Header |
| JWOL | Wake-On-LAN Header |
| JWOR | Wake-On-Ring Header |
| SPKR | Onboard Speaker (Buzzer) |
| USB0/1 | Universal Serial Ports0/1 |
| USB2/3/4 | USB Headers |
| VGA | Video Port |

# 5-9 Connector Definitions

## Primary ATX Power Supply Connector

The primary power supply connector (J1B4) on the H8DAR-T meets the SSI (Superset ATX) 24-pin specification. Refer to the table on the right for the pin definitions of the ATX 24-pin power connector.

Note: You must also connect the 8-pin (JPW2) power connector to your power supply (see below).

**ATX Power 24-pin Connector Pin Definitions (J1B4)**

| Pin# | Definition | Pin # | Definition |
|---|---|---|---|
| 13 | +3.3V | 1 | +3.3V |
| 14 | -12V | 2 | +3.3V |
| 15 | COM | 3 | COM |
| 16 | PS_ON | 4 | +5V |
| 17 | COM | 5 | COM |
| 18 | COM | 6 | +5V |
| 19 | COM | 7 | COM |
| 20 | Res (NC) | 8 | PWR_OK |
| 21 | +5V | 9 | 5VSB |
| 22 | +5V | 10 | +12V |
| 23 | +5V | 11 | +12V |
| 24 | COM | 12 | +3.3V |

## Secondary Power Connector

In addition to the Primary ATX power connector (above), the Secondary 12v 8-pin power connector at JPW2 must also be connected to your power supply. See the table on the right for pin definitions.

**Secondary Power Connector Pin Definitions (JPW2)**

| Pins | Definition |
|---|---|
| 1 through 4 | Ground |
| 5 through 8 | +12V |

**Required Connection**

## Auxiliary Power Connector

The 4-pin auxiliary power connector at J32 supplies extra power that may be needed for systems with high loads. See the table on the right for pin definitions.

**Auxiliary Power Connector Pin Definitions (J32)**

| Pins | Definition |
|---|---|
| 1 & 2 | Ground |
| 3 & 4 | +12V |

**Recommended Connection**

## NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

**NMI Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 19 | Control |
| 20 | Ground |

### Power LED

The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table on the right for pin definitions.

| Power LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 15 | Vcc |
| 16 | Control |

### HDD LED

The HDD (IDE Hard Disk Drive) LED connection is located on pins 13 and 14 of JF1. Attach the IDE hard drive LED cable to display disk activity. Refer to the table on the right for pin definitions.

| HDD LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 13 | Vcc |
| 14 | HD Active |

### NIC1 LED

The NIC1 (Network Interface Controller) LED connection is located on pins 11 and 12 of JF1. Attach the NIC1 LED cable to display network activity. Refer to the table on the right for pin definitions.

| NIC1 LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 11 | Vcc |
| 12 | NIC1 Active |

### NIC2 LED

The NIC2 (Network Interface Controller) LED connection is located on pins 9 and 10 of JF1. Attach the NIC2 LED cable to display network activity. Refer to the table on the right for pin definitions.

| NIC2 LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 9 | Vcc |
| 10 | NIC2 Active |

### Overheat/Fan Fail LED

Connect an LED to the OH connection on pins 7 and 8 of JF1 to provide advanced warning of chassis overheating. Refer to the table on the right for pin definitions.

| OH/Fan Fail LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 7 | Vcc |
| 8 | Control |

### Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions. This feature is only available for systems with redundant power supplies.

**Power Fail LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 5 | Vcc |
| 6 | Control |

### Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to the hardware reset switch on the computer case. Refer to the table on the right for pin definitions.

**Reset Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 3 | Reset |
| 4 | Ground |

### Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (see the Power Button Mode setting in BIOS). To turn off the power when set to suspend mode, depress the button for at least 4 seconds. Refer to the table on the right for pin definitions.

**Power Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 1 | PW_ON |
| 2 | Ground |

### Universal Serial Bus Ports (USB0/1)

Two Universal Serial Bus ports (USB1.1) are located between the mouse port and the COM1 port. See the table on the right for pin definitions.

**Universal Serial Bus Ports Pin Definitions (USB0/1)**

| USB0 | | USB1 | |
|---|---|---|---|
| Pin # | Definition | Pin # | Definition |
| 1 | +5V | 1 | +5V |
| 2 | PO- | 2 | PO- |
| 3 | PO+ | 3 | PO+ |
| 4 | Ground | 4 | Ground |

## Extra USB Headers

Three additional USB1.1 headers (USB2/3/4) are included on the serverboard. These may be connected to provide front side access. USB cables (not included) are needed for the connections. See the table on the right for pin definitions.

**Extra Universal Serial Bus Headers Pin Definitions (USB2/3/4)**

| USB2 | | USB3/4 | |
|---|---|---|---|
| Pin # | Definition | Pin # | Definition |
| 1 | +5V | 1 | +5V |
| 2 | PO- | 2 | PO- |
| 3 | PO+ | 3 | PO+ |
| 4 | Ground | 4 | Ground |
| 5 | Key | 5 | No connection |

## Serial Ports

The COM1 serial port is located beside the USB ports. COM2 is a header on the serverboard located near the floppy drive connector (see serverboard layout for location). See the table on the right for pin definitions.

**Serial Port Pin Definitions (COM1/COM2)**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | CD | 6 | DSR |
| 2 | RD | 7 | RTS |
| 3 | TD | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | Ground | 10 | NC |

**Note:** Pin 10 is included on the header but not on the port. NC indicates no connection.

## Fan Headers

The H8DAR-T has five headers (FAN1-FAN5). Fan speed is controlled via Thermal Management with a BIOS setting. See the table on the right for pin definitions.

**Fan Header Pin Definitions (FAN1-5)**

| Pin# | Definition |
|---|---|
| 1 | Ground (Black) |
| 2 | +12V (Red) |
| 3 | Tachometer |
| 4 | PWM Control |

## Power Fail and Alarm Reset Header

Connect a cable from your power supply to the JP10 header to provide you with warning of a power supply failure. The warning signal is passed through the PWR_LED pin to indicate a power failure. See the table on the right for pin definitions.

**Power Fail/Alarm Reset Header Pin Definitions (JP10)**

| Pin# | Definition |
|---|---|
| 1 | P/S 1 Fail Signal |
| 2 | P/S 2 Fail Signal |
| 3 | P/S 3 Fail Signal |
| 4 | Reset (from MB) |

**Note:** This feature is only available when using redundant power supplies.

## Power LED/Speaker

On JD1, pins 1, 2, and 3 are for the power LED and pins 4 through 7 are for the speaker. See the tables on the right for pin definitions.

**Note:** The speaker connector pins are for use with an external speaker. If you wish to use the onboard speaker, you should close pins 6 and 7 with a jumper.

**PWR LED Connector Pin Definitions (JD1)**

| Pin# | Definition |
|---|---|
| 1 | +Vcc |
| 2 | -Vcc |
| 3 | -Vcc |

**Speaker Connector Pin Definitions (JD1)**

| Pin# | Definition |
|---|---|
| 4 | Red wire, Speaker data |
| 5 | No connection |
| 6 | Buzzer signal |
| 7 | Speaker data |

## ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse ports are located at J101 and J132, respectively. See the table on the right for pin definitions.

**PS/2 Keyboard and Mouse Port Pin Definitions (J101/J132)**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | Data | 4 | VCC |
| 2 | NC | 5 | Clock |
| 3 | Ground | 6 | NC |

## Wake-On-Ring

The Wake-On-Ring header is designated JWOR. This function allows your computer to receive and "wake-up" by an incoming call to the modem when in suspend state. See the table on the right for pin definitions. You must have a Wake-On-Ring card and cable to use this feature.

**Wake-On-Ring Pin Definitions (JWOR)**

| Pin# | Definition |
|---|---|
| 1 | Ground (Black) |
| 2 | Wake-up |

## Wake-On-LAN

The Wake-On-LAN header is designated JWOL. See the table on the right for pin definitions. You must have a LAN card with a Wake-On-LAN connector and cable to use the Wake-On-LAN feature.

**Wake-On-LAN Pin Definitions (JWOL)**

| Pin# | Definition |
|---|---|
| 1 | +5V Standby |
| 2 | Ground |
| 3 | Wake-up |

### Chassis Intrusion

A Chassis Intrusion header is located at JL1. Attach the appropriate cable to inform you of a chassis intrusion.

| Chassis Intrusion Pin Definitions (JL1) | |
|---|---|
| Pin# | Definition |
| 1 | Intrusion Input |
| 2 | Ground |

### JLAN1/2 (Ethernet Ports)

Two Gigabit Ethernet ports (designated JLAN1 and JLAN2) are located beside the VGA port. These ports accept RJ45 type cables.

### SATA (I²C) Header

The header at JS10 is for SATA I²C, which may be used to monitor the status of the power supply, fans and system temperature. See the table on the right for pin definitions.

| SATA I²C Pin Definitions (JS10) | |
|---|---|
| Pin# | Definition |
| 1 | Data |
| 2 | Ground |
| 3 | Clock |

### SMB Header

The System Management Bus header is located at J22. Connect the appropriate cable here to utilize SMB on your system. See the table on the right for pin definitions.

| SMB Pin Definitions (J22) | |
|---|---|
| Pin# | Definition |
| 1 | SMB Data |
| 2 | Ground |
| 3 | SMB Clock |
| 4 | N/A |

## Overheat LED (JOH1)

Connect an LED to the JOH1 header to provide warning of chassis overheating. See the table on the right for pin definitions.

**Overheat LED Pin Definitions (JOH1)**

| Pin# | Definition |
|---|---|
| 1 | +5V |
| 2 | OH Active |

## Serial ATA Activity LED

Connect an LED to the JS9 header to provide indication of Serial ATA drive activity. See the table on the right for pin definitions.

**Serial ATA Activity LED Pin Definitions (JS9)**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | SATA0 LED | 6 | NC |
| 2 | SATA1 LED | 7 | NC |
| 3 | SATA2 LED | 8 | NC |
| 4 | SATA3 LED | 9 | NC |
| 5 | Ground | 10 | Key |

**Note:** NC indicates no connection.

## Keylock

A keylock header is located at JK1. Utilizing this header allows you to inhibit any actions made on the keyboard, effectively "locking" it. See the table on the right for pin definitions.

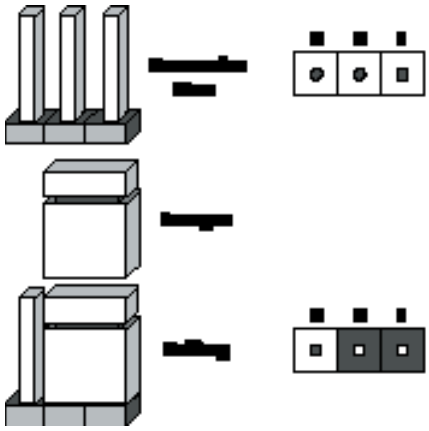
**Keylock Pin Definitions (JK1)**

| Pin# | Definition |
|---|---|
| 1 | Ground |
| 2 | Keylock R-N |

# 5-10 Jumper Settings

## Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram at right for an example of jumping pins 1 and 2. Refer to the serverboard layout page for jumper locations.



**Note 1:** On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

## CMOS Clear

JBT1 is used to clear CMOS and will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To clear CMOS,

1) First power down the system and unplug the power cord(s).
2) With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver for at least four seconds.
3) Remove the screwdriver (or shorting device).
4) Reconnect the power cord(s) and power on the system.

**Notes:**

*Do not use the PW_ON connector to clear CMOS*.

The onboard battery does not need to be removed when clearing CMOS, however you must short JBT1 for at least four seconds.

JBT1 contact pads

### JLAN1/2 Enable/Disable

Change the setting of jumper JPL to enable or disable the JLAN1 and JLAN2 Gb Ethernet ports. See the table on the right for jumper settings. The default setting is enabled

| JLAN1/2 Enable/Disable Jumper Settings (JPL) | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

| VGA Enable/Disable Jumper Settings (JPG1) | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### I²C to PCI Enable/Disable

JI²C1/2 pair of jumpers allow you to connect the System Management Bus to any one of the PCI slots. The default setting is closed (on) for both jumpers to enable the connection. Both connectors must have the same setting (JI²C1 is for data and JI²C2 is for the clock). See the table on right for pin definitions.

| I²C to PCI Enable/Disable Jumper Settings (JI²C1/2) | |
|---|---|
| Jumper Setting | Definition |
| Closed | Enabled |
| Open | Disabled |

### SATA Controller Enable/ Disable (H8DAR-T)

Jumper JPS1 is used to enable or disable the onboard Serial ATA controller. The default setting is on pins 1-2 to enable SATA. See the table on right for pin definitions.

| SATA Enable/Disable Jumper Settings (JPS1) | |
|---|---|
| Both Jumpers | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

## Onboard Speaker Enable/ Disable

The JD1 header allows you to use either an external speaker or the internal (onboard) speaker. To use the internal (onboard) speaker, close pins 6 and 7 with a jumper. To use an external speaker, connect the speaker wires to pins 4 through 7 of JD1. See the table on the right for settings and the table associated with the Power LED/Speaker connection (previous section) for pin definitions.

**Onboard Speaker Enable/Disable Pin Definitions (JD1)**

| Pins | Definition |
|---|---|
| 6-7 | Jump for onboard speaker |
| 4-7 | Attach external speaker wires |

## 3rd Power Supply Fail Signal Enable/Disable

The system can notify you in the event of a power supply failure. This feature assumes that three redundant power supply units are installed in the chassis. If you only have one or two power supplies installed, you should disable the function with the J3P header to prevent false alarms. See the table on the right for jumper settings.

**3rd Power Supply Fail Signal Jumper Settings (J3P)**

| Jumper Setting | Definition |
|---|---|
| Open | Enabled |
| Closed | Disabled |

## Watch Dog Enable/Disable

JWD controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application hangs. Pins 1-2 will cause WD to reset the system if an application has frozen. Pins 2-3 will generate a non-maskable interrupt signal for the application that is frozen. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

**Watch Dog Jumper Settings (JWD)**

| Jumper Setting | Definition |
|---|---|
| Pins 1-2 | Reset |
| Pins 2-3 | NMI |
| Open | Disabled |

**Note:** When enabled, the user needs to write their own application software in order to disable the Watch Dog Timer.

# 5-11 Onboard Indicators

## JLAN1/JLAN2 LEDs

The Ethernet ports (located beside the VGA port) have two LEDs. On each Gb LAN port, the yellow (right) LED indicates activity while the left LED may be green, orange or off to indicate the speed of the connection. See the table on the right for the functions associated with the left (activity speed) LED.

| JLAN1/2 Right LED (Connection Speed Indicator) | |
|---|---|
| LED Color | Definition |
| Off | 10 MHz |
| Green | 100 MHz |
| Amber | 1 GHz |

## +3.3V Power LED

When illuminated, the DP5 LED indicates that power from the power supply is being supplied to the serverboard (DP5 indicates the presence of +3.3V). See the table on the right for DP5 LED states.

| +3.3V Power LED (DP5) | |
|---|---|
| Color | System Status |
| Green | Power present on serverboard |
| Off | No power present on serverboard |

## 5-12 Floppy, IDE and SATA Drive Connections

Use the following information to connect the floppy and hard disk drive cables.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.
- The 80-wire ATA133 IDE hard disk drive cable that came with your system has two connectors to support two drives. This special cable should be used to take advantage of the speed this new technology offers. The blue connector connects to the onboard IDE connector interface and the other connector(s) to your hard drive(s). Consult the documentation that came with your disk drive for details on actual jumper locations and settings for the hard disk drive.

### Floppy Connector

The floppy connector at JFDD1 is located beside the IDE#1 connector. See the table on the right for pin definitions.

**Floppy Drive Connector Pin Definitions (JFDD1)**

| Pin# | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | GND | 2 | FDHDIN |
| 3 | GND | 4 | Reserved |
| 5 | Key | 6 | FDEDIN |
| 7 | GND | 8 | Index- |
| 9 | GND | 10 | Motor Enable |
| 11 | GND | 12 | Drive Select B- |
| 13 | GND | 14 | Drive Select A- |
| 15 | GND | 16 | Motor Enable |
| 17 | GND | 18 | DIR- |
| 19 | GND | 20 | STEP- |
| 21 | GND | 22 | Write Data- |
| 23 | GND | 24 | Write Gate- |
| 25 | GND | 26 | Track 00- |
| 27 | GND | 28 | Write Protect- |
| 29 | GND | 30 | Read Data- |
| 31 | GND | 32 | Side 1 Select- |
| 33 | GND | 34 | Diskette |

## IDE Connectors

There are no jumpers to configure the onboard JIDE#1 and JIDE#2 connectors. See the table on the right for pin definitions.

**IDE Drive Connectors**
**Pin Definitions (JIDE#1/JIDE#2)**

| Pin# | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | Reset IDE | 2 | Ground |
| 3 | Host Data 7 | 4 | Host Data 8 |
| 5 | Host Data 6 | 6 | Host Data 9 |
| 7 | Host Data 5 | 8 | Host Data 10 |
| 9 | Host Data 4 | 10 | Host Data 11 |
| 11 | Host Data 3 | 12 | Host Data 12 |
| 13 | Host Data 2 | 14 | Host Data 13 |
| 15 | Host Data 1 | 16 | Host Data 14 |
| 17 | Host Data 0 | 18 | Host Data 15 |
| 19 | Ground | 20 | Key |
| 21 | DRQ3 | 22 | Ground |
| 23 | I/O Write | 24 | Ground |
| 25 | I/O Read | 26 | Ground |
| 27 | IOCHRDY | 28 | BALE |
| 29 | DACK3 | 30 | Ground |
| 31 | IRQ14 | 32 | IOCS16 |
| 33 | Addr1 | 34 | Ground |
| 35 | Addr0 | 36 | Addr2 |
| 37 | Chip Select 0 | 38 | Chip Select 1 |
| 39 | Activity | 40 | Ground |

## SATA Connectors

There are no jumpers to configure the SATA connectors, which are designated JS1, JS11, JS12 and JS13. See the table on the right for pin definitions.

**SATA Drive Connectors**
**Pin Definitions (JS1, JS11-JS13)**

| Pin # | Definition |
|---|---|
| 1 | Ground |
| 2 | TXP |
| 3 | TXN |
| 4 | Ground |
| 5 | RXN |
| 6 | RXP |
| 7 | Ground |

# Chapter 6

# Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC813T+-500 chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the next step.

### Tools Required

The only tool you will need to install components and perform maintenance is a Philips screwdriver.

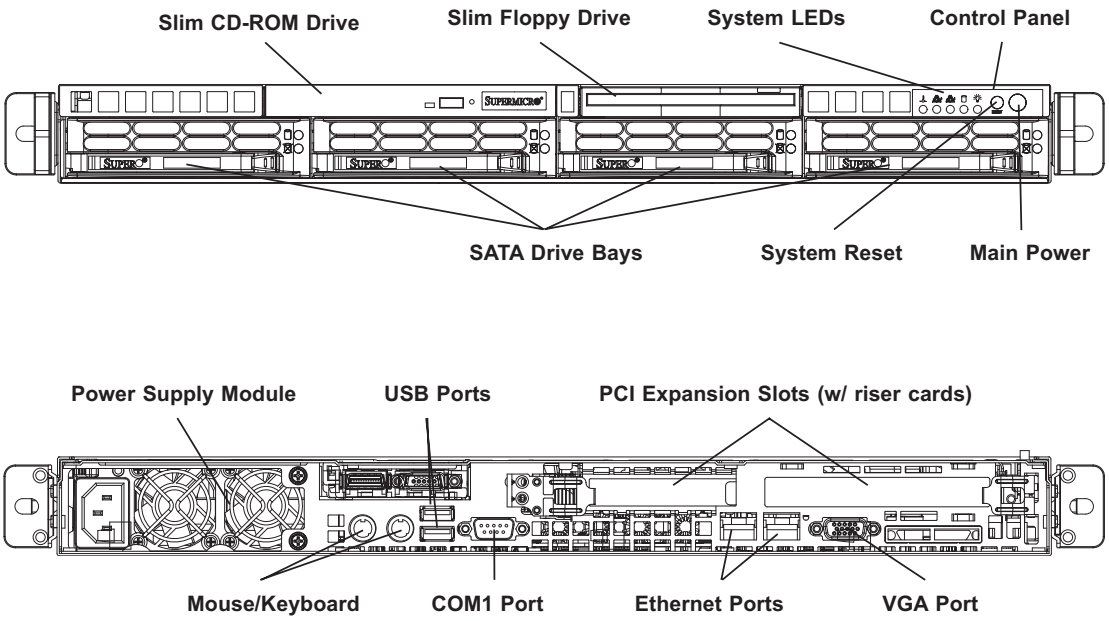
## 6-1 Static-Sensitive Devices

Electricstatic discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD damage.

### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

**Figure 6-1. Chassis: Front and Rear Views**




## 6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system status indications. These wires have been bundled together as a ribbon cable to simplify the connection. Connect the cable from JF1 on the serverboard to the appropriate header on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path.

The control panel LEDs inform you of system status. See "Chapter 3: System Interface" for details on the LEDs and the control panel buttons. Details on JF1 can be found in "Chapter 5: Advanced Serverboard Setup."

# 6-3 System Fans

Four high-performance, counter-rotating 4-cm fans provide all the cooling needed for the 1020A-T. Each fan is actually made up of two fans joined back-to-back that rotate in opposite directions. This counter-rotating action generates exceptional airflow airflow while dampening vibration levels.

These fans can adjust their speed according to the heat level sensed in the system, which results in more efficient and quieter fan operation. Fan speed is controlled by a BIOS setting (see Chapter 7).

It is very important that the chassis top cover is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis and cool the components. See Figure 6-2.

## System Fan Failure

If a fan fails, the remaining fans will ramp up to full speed and the overheat/fan fail LED on the control panel will turn on. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan). Remove the top chassis cover (see instructions on p. 2-8) while the system is still running to determine which of the four fan units has failed. Then power down the system before replacing a fan. Removing the power cord(s) is also recommended as a safety precaution.

## Replacing System Cooling Fans

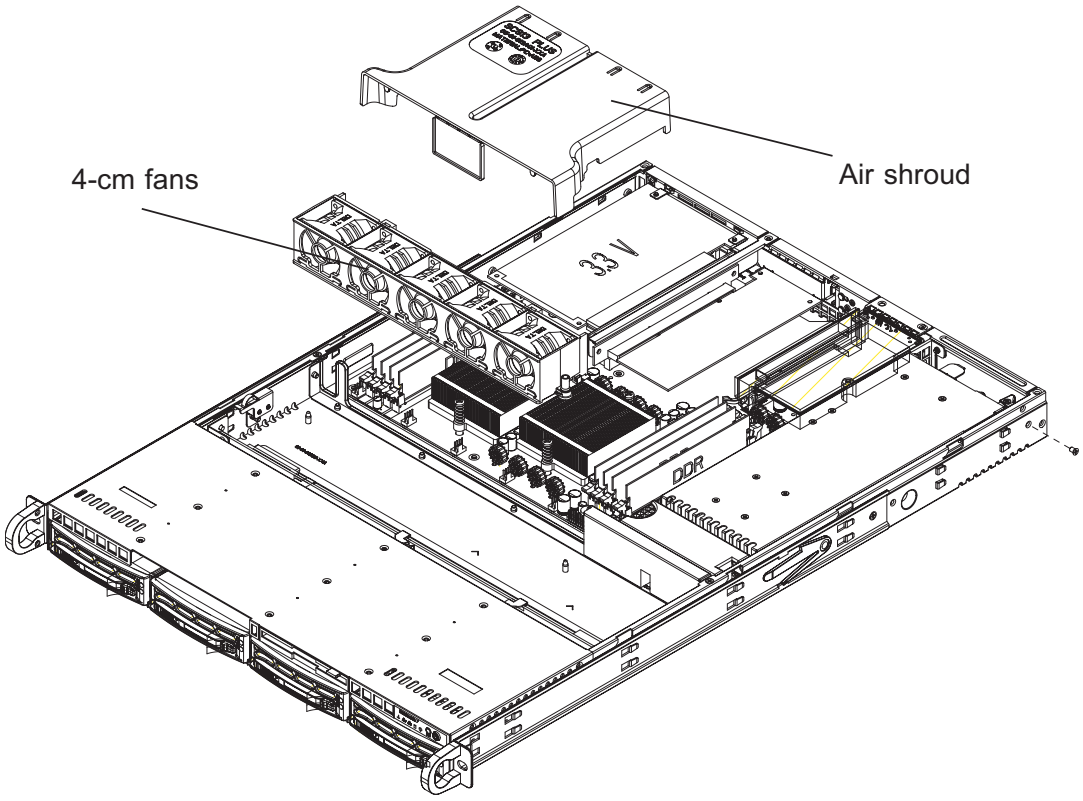
### 1. Removing a fan

After turning off the power to the system, first remove the chassis cover and unplug **all** the fan cables from the serverboard. Grasp the rectangular housing that holds the fan units and lift it out of the chassis (see Figure 6-2). Push the failed fan unit out through the bottom of the fan housing.

### 2. Installing a new fan

Replace the failed fan with an identical 4-cm, 12 VDC fan (p/n FAN-0083). Push the new fan into the vacant space in the housing while making sure the arrows on the top of the fan (indicating direction of airflow) point in the same direction as the arrows on the other fans. Reposition the fan housing on the mounting posts in the chassis, then reconnnect the fan wires to the same fan headers you removed them from. Power up the system and check that the fan is working properly and that the LED on the control panel has turned off. Finish by replacing the chassis cover.

**Figure 6-2. System Cooling Fans**

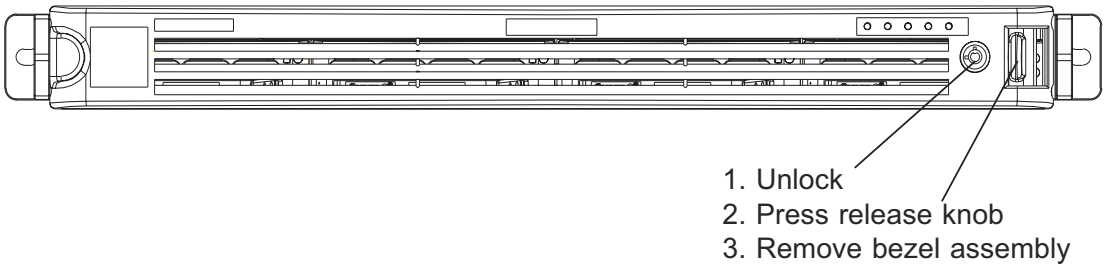



## 6-4 Drive Bay Installation/Removal

### Removing the Front Bezel

If your system has a front bezel (optional) attached to the chassis, you must first remove it to gain access to the drive bays. To remove the bezel, first unlock the front of the chassis then press the release knob (see Figure 6-3). Carefully remove the bezel with both hands. A filter located within the bezel can be removed for replacement/cleaning. It is recommended that you keep a maintenance log of filter cleaning/replacement, since its condition will affect the airflow throughout the whole system.

**Figure 6-3. Removing the Front Bezel**




## Accessing the Drive Bays

Serial ATA Drives: Because of their hotswap capability, you do not need to access the inside of the chassis or power down the system to install or replace Serial ATA drives. Proceed to the next step for instructions.

CD-ROM/Floppy Disk Drives: For installing/removing a CD-ROM or floppy disk drive, you will need to gain access to the inside of the 1020A-T by removing the top cover of the chassis. Proceed to the "CD-ROM and Floppy Drive Installation" section later in this chapter for instructions.

**Note:** Only a "slim" CD-ROM drive will fit into the 1020A-T.

## Serial ATA Drive Installation

### 1. Mounting a Serial ATA drive in a drive carrier

The Serial ATA drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the Serial ATA drive bays. For this reason, even empty carriers without Serial ATA drives installed must remain in the chassis. To add a new Serial ATA drive, install a drive into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier. Secure the drive to the carrier with six screws, as shown in Figure 6-4.

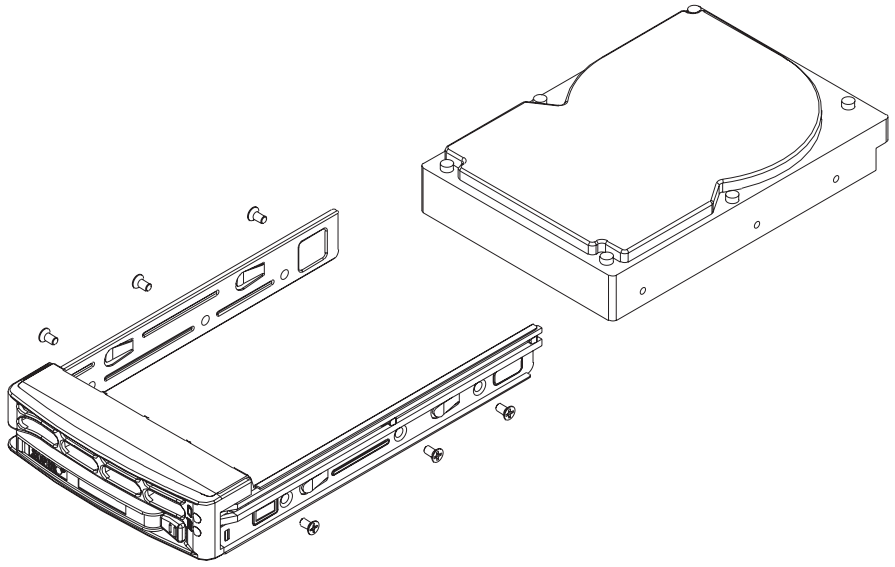


**Figure 6-4. Mounting an SATA Drive in a Carrier**

**Use caution when working around the Serial ATA backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.**

**Important: Regardless of how many Serial ATA hard drives are installed, all drive carriers must remain in the drive bays to maintain proper airflow.**

### 2. Installing/removing hot-swap SATA drives

The SATA drive carriers are all easily accessible at the front of the chassis. These hard drives are hot-pluggable, meaning they can be removed and installed without powering down the system. To remove a carrier, push the release button located beside the drive LEDs. Then swing the colored handle fully out and use it to pull the unit straight out (see Figure 6-5).

**Note:** Your operating system must have RAID support to enable the hot-plug capability of the SATA drives.

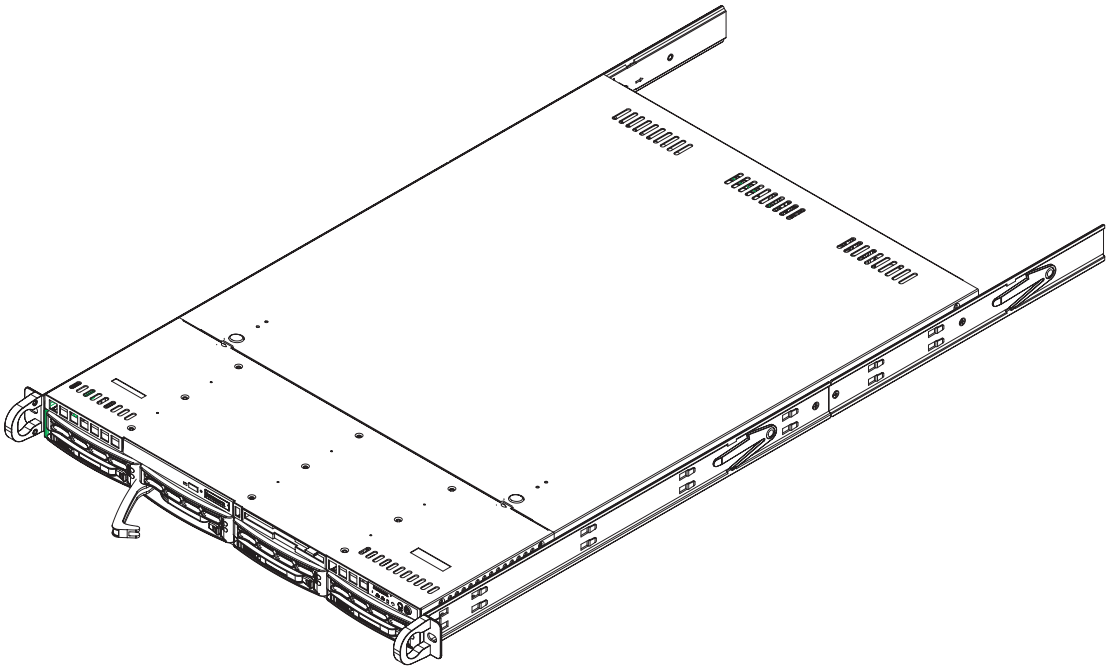


**Figure 6-5. Removing an SATA Drive from the Server**

### Serial ATA Power Cables

Serial ATA power cables should be routed so that they do not block the airflow through the chassis. See the motherboard layout diagram for the location of the cable connections.

### Serial ATA Backplane

The Serial ATA drives plug into a backplane that provides power, drive ID and bus termination. A RAID controller can be used with the backplane to provide data security. The operating system you use must have RAID support to enable the hot-swap capability of the Serial ATA drives. The backplane is already preconfigured, so there are no jumpers or switches present on it.

## CD-ROM and Floppy Drive Installation

The top cover of the chassis must be opened to gain full access to the CD-ROM and floppy drive bays. The 1020A-T accomodates only slim-line CD-ROM drives. Side mounting brackets are needed to mount a slim-line CD-ROM drive in the 1020A-T server.

You must power down the system before installing or removing a floppy or CD-ROM drive. First, release the retention screws that secure the server unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover and at the same time, push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server.

With the chassis cover removed, unplug the power and data cables from the drive you want to remove. Then locate the locking tab at the rear of the drive. It will be on the left side of the drive when viewed from the front of the chassis. Pull the tab away from the drive and push the drive unit out the front of the chassis. Add a new drive by following this procedure in reverse order. You may hear a faint *click* of the locking tab when the drive is fully inserted. Remember to reconnect the data and power cables to the drive before replacing the chassis cover and restoring power to the system. Please be aware of the following:

- The floppy disk drive cable has seven twisted wires.
- A color mark on a cable typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

# 6-5 Power Supply

The 1020A-T has a single 500 watt power supply, which is auto-switching capable. This enables it to automatically sense and operate at a 100v to 240v input voltage. An amber light will be illuminated on the power supply when the power is off. An illuminated green light indicates that the power supply is operating.

## Power Supply Failure

If the power supply unit fails, the system will shut down and you will need to replace the unit. Replacement units can be ordered directly from the manufacturer. As there is only one power supply unit in the 1020A-T, power must be completely removed from the server before removing and replacing the power supply unit for whatever reason.

## Removing/Replacing the Power Supply

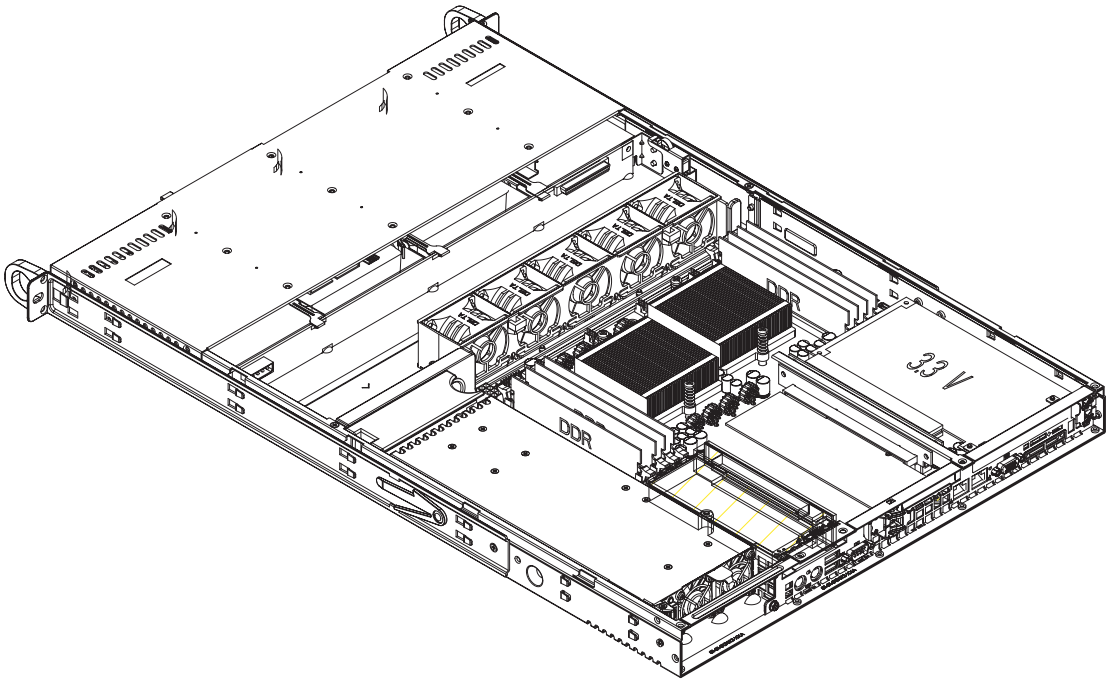
### 1. Removing the power supply

First turn the power switch on the control panel off, then unplug the power cord from the system. Remove the chassis cover by pressing the two release buttons on the top of the chassis (near the front) and push the chassis top rearward about one inch. To remove the failed power unit, push the beige colored release tab to the right and then carefully lift the unit up about 1/2 inch only. If you lift too high, you may damage the power distribution board that the other end of the unit is connected to. Then, pull the power unit straight back to unplug it from the power distribution board. See Figure 6-6.

### 2. Installing a new power supply

Replace the failed unit with another unit of the same input voltage, output voltage and wattage. It is highly recommended to replace it with exactly the same model power supply. Carefully insert the new unit into position to plug it into the power distribution board, making sure you are not holding it at too great an angle, which may damage the power distribution board. Push it completely into the power distribution board and seat it in the chassis. When correctly installed it should be laying flat - make sure the end of the power supply is not sitting on the stop in the chassis. Reconnect the power cord, replace the chassis top cover and reposition the unit back into the rack. Finish by depressing the power button on the chassis front control panel.

**Figure 6-6. Removing/Replacing the Power Supply**



# Chapter 7

# BIOS

## 7-1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the H8DAR-T. The AMI ROM BIOS is stored in a flash chip and can be easily upgraded using a floppy disk-based program.

**Note:** Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Please refer to the Manual Download area of our web site for any changes to BIOS that may not be reflected in this manual.

### Starting the Setup Utility

To enter the BIOS Setup Utility, hit the <Delete> key while the system is booting-up. (In most cases, the <Delete> key is used to invoke the BIOS setup screen. There are a few cases when other keys are used, such as <F1>, <F2>, etc.) Each main BIOS menu option is described in this manual.

The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. “Grayed-out” options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (Note that BIOS has default text messages built in. We retain the option to include, omit, or change any of these text messages.) Settings printed in **Bold** are the default values.
A "▶" indicates a submenu. Highlighting such an item and pressing the <Enter> key will open the list of settings within that submenu.

The BIOS setup utility uses a key-based navigation system called hot keys. Most of these hot keys (<F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

**Note:** fan speed is controlled by the "Fan Speed Control Modules" setting in BIOS. The recommended setting for the A+ 1020A-T is "3-pin (Server)". You may have to reset this setting after flashing BIOS or loading BIOS default values.

## 7-2 Main Setup

When you first enter AMI BIOS Setup Utility, you will see the Main setup screen. You can always return to the Main setup screen by selecting the ***Main*** tab on the top of the screen.

The Main Setup screen provides you with a system overview, which includes the version, built date and ID of the AMIBIOS, the type, speed and number of the processors in the system and the amount of memory installed in the system.

### System Time/System Date

You can edit this field to change the system time and date. Highlight *System Time* or *System Date* using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in DAY/MM/DD/YYYY format. The time is entered in HH:MM:SS format. Please note that time is in a 24-hour format. For example, 5:30 A.M. appears as 05:30:00 and 5:30 P.M. as 17:30:00.

## 7-3 Advanced Settings Menu

### ▶ CPU Configuration Sub-Menu

### GART Error Reporting

This setting is used for testing only.

### MTRR Mapping

This determines the method used for programming CPU MTRRs when 4 GB or more memory is present. The options are **Continuous**, which makes the PCI hole non-cacheable, and Discrete, which places the PCI hole below the 4 GB boundary.

## ▶ IDE Configuration

### Onboard PCI IDE Controller

The following options are available to set the IDE controller status: Disabled will disable the controller. Primary will enable the primary IDE controller only. Secondary will enable the secondary IDE controller only. **Both** will enable both the primary and the secondary IDE controllers.

### Primary IDE Master/Slave, Secondary IDE Master/Slave

Highlight one of the four items above and press <Enter> to access the submenu for that item.

#### Type

Select the type of device connected to the system. The options are Not Installed, **Auto**, CDROM and ARMD.

#### LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In the LBA mode, the maximum drive capacity is 137 GB. For drive capacities of over 137 GB, your system must be equipped with 48-bit LBA mode addressing. If not, contact your manufacturer or install an ATA/133 IDE controller card that supports 48-bit LBA mode. The options are Disabled and **Auto**.

#### Block (Multi-Sector Transfer)

Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt. Select "Disabled" to allow the data to be transferred from and to the device one sector at a time. Select "Auto" to allows the data transfer from and to the device occur multiple sectors at a time if the device supports it. The options are **Auto** and Disabled.

#### PIO Mode

PIO (Programmable I/O) mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The options are **Auto**, 0, 1, 2, 3, and 4. Select Auto to allow AMI BIOS to auto detect the PIO mode. Use this value if the IDE disk drive support cannot be determined. Select 0 to allow AMI BIOS to use PIO mode 0. It has a

data transfer rate of 3.3 MBs. Select 1 to allow AMI BIOS to use PIO mode 1 for a data transfer rate of 5.2 MBs. Select 2 to allow AMI BIOS to use PIO mode 2 for a data transfer rate of 8.3 MBs. Select 3 to allow AMI BIOS to use PIO mode 3 for a data transfer rate of 11.1 MBs. Select 4 to allow AMI BIOS to use PIO mode 4 for a data transfer rate of 16.6 MBs. This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.

### S.M.A.R.T. For Hard disk drives

Self-Monitoring Analysis and Reporting Technology (SMART) can help predict impending drive failures. Select "Auto" to allow BIOS to auto detect hard disk drive support. Select "Disabled" to prevent AMI BIOS from using the S.M.A.R.T. Select "Enabled" to allow AMI BIOS to use the S.M.A.R.T. to support hard drive disk. The options are Disabled, Enabled, and **Auto**.

### 32-Bit Data Transfer

Select "Enabled" to activate the function of 32-Bit data transfer. Select "Disabled" to deactivate the function. The options are Enabled and **Disabled**.

### Hard Disk Write Protect

Select Enabled to enable the function of Hard Disk Write Protect to prevent data from being written to HDD. The options are Enabled or **Disabled**.

### IDE Detect Time Out (Sec)

This feature allows the user to set the time-out value for detecting ATA, ATA PI devices installed in the system. The options are 0 (sec), **5**, 10, 15, 20, 25, 30 and 35.

### ATA(PI) 80Pin Cable Detection

This setting allows AMI BIOS to auto-detect the 80-Pin ATA(PI) cable. The options are Host & Device, Host and **Device**.

## ▶ Floppy Configuration

### Floppy A

Move the cursor to these fields via up and down <arrow> keys to select the floppy type. The options are Disabled, 360 KB 5 1/4", 1.2 MB 5 1/4", 720 KB 3½", **1.44 MB 3½"**, and 2.88 MB 3½".

### Floppy B

Move the cursor to these fields via up and down <arrow> keys to select the floppy type. The options are **Disabled**, 360 KB 5 1/4", 1.2 MB 5 1/4", 720 KB 3½", 1.44 MB 3½", and 2.88 MB 3½".

### Onboard Floppy Controller

Use this setting to **Enable** or Disable the onboard floppy controller.

## ▶Super IO Configuration

### Serial Port1 Address

This option specifies the base I/O port address and Interrupt Request address of serial port 1. Select "Disabled" to prevent the serial port from accessing any system resources. When this option is set to *Disabled*, the serial port physically becomes unavailable. Select "3F8/IRQ4" to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. The options are Disabled, **3F8/IRQ4**, 3E8/IRQ4 and 2E8/IRQ3.

### Serial Port2 Address

This option specifies the base I/O port address and Interrupt Request address of serial port 2. Select "Disabled" to prevent the serial port from accessing any system resources. When this option is set to "Disabled", the serial port physically becomes unavailable. Select "2F8/IRQ3" to allow the serial port to use 2F8 as its I/O port address and IRQ 3 for the interrupt address. The options are Disabled, **2F8/IRQ3**, 3E8/IRQ4 and 2E8/IRQ3.

### Serial Port 2 Mode

Tells BIOS which mode to select for serial port 2. The options are **Normal**, IrDA and ASKIR.

### Parallel Port Address

This option specifies the I/O address used by the parallel port. Select Disabled to prevent the parallel port from accessing any system resources. When the value of this option is set to Disabled, the printer port becomes unavailable. Select **378** to allow the parallel port to use 378 as its I/O port address. The majority of parallel ports on computer systems use IRQ7 and I/O Port 378H as the standard setting. Select 278 to allow the parallel port to use 278 as its I/O port address. Select 3BC to allow the parallel port to use 3BC as its I/O port address.

### Parallel Port Mode

Specify the parallel port mode. The options are **Normal**, Bi-directional, EPP and ECP.

### Parallel Port IRQ

Select the IRQ (interrupt request) for the parallel port. The options are IRQ5 and **IRQ7**.

## ▶ ACPI Configuration

### ACPI Aware OS

Use this setting to tell BIOS if the operating system recognizes ACPI functions. The options are **Yes** and No.

## ▶ Advanced ACPI Configuration

### ACPI 2.0 Support

Select "Yes" if your system supports ACPI 2.0, which will add additional tables as per ACPI 2.0 specifications. Options are Yes and **No**.

### ACPI APIC Support

Select "Enabled" to allow the ACPI APIC Table Pointer to be included in the RSDT pointer list. The options are **Enabled** and Disabled.

### ACPI SRAT Table

This setting allows you to enable or disable the building of an ACPI SRAT table. Options are **Enabled** and Disabled.

### BIOS --> AML ACPI Table

When Enabled, BIOS-->AML exchange table pointer to be included in (X) REDT pointer list. Options are **Enabled** and Disabled.

### Headless Mode

Select "Enabled" to activate the Headless Operation Mode through ACPI. The options are Enabled and **Disabled**.

### OS Console Redirection

When "Enabled", BIOS provides additional options to select remote access type. The options are Enabled and **Disabled**.

### PME, R1 S5 Wake Up

The options are Enabled and **Disabled**.

## ▶ Event Log Configuration

### View Event Log

Highlight this item and press <Enter> to view the contents of the event log.

### Mark All Events as Read

Highlight this item and press <Enter> to mark the DMI events as read.

### Clear Event Log

This setting will clear all event logs when set to "OK". The options are OK and **Cancel**.

### Event Log Statistics

Highlight this item and press <Enter> to view details on the count of total unread events.

## ▶ Hyper Transport Configuration

### CPU0: CPU1 HT Link1 Speed

The HT link will run at the speed specified in this setting if it is slower than or equal to the system clock and if the board is capable. Options are **Auto**, 200 MHz, 400 MHz, 600 MHz, 800 MHz and 1 GHz.

### CPU0: CPU1 HT Link1 Width

The HT link will run at the width specified in this setting. Options are **Auto**, 2 bit, 4 bit, 8 bit and 16 bit.

### CPU0: PCI-X0 HT Link1 Speed

The HT link will run at the speed specified in this setting if it is slower than or equal to the system clock and if the board is capable. Options are **Auto**, 200 MHz, 400 MHz and 600 MHz.

### CPU0: PCI-X0 HT Link1 Width

The HT link will run at the width specified in this setting. Options are **Auto**, 2 bit, 4 bit, 8 bit and 16 bit.

## ▶ MPS Configuration

### MPS Revision

This setting allows the user to select the MPS revision level. The options are 1.1 and **1.4.**

## ▶ Remote Access Configuration

### Remote Access

Use this setting to Enable or **Disable** remote access. If Enabled is selected, you can select a Remote Access type.

## ▶ USB Configuration

This screen will display the module version and all USB enabled devices.

### Legacy USB Support

Select "Enabled" to enable the support for USB Legacy. Disable Legacy support if there are no USB devices installed in the system. The options are Disabled, **Enabled** and Auto.

## ▶ System Health Monitor

### CPU Overheat Temperature

Use the "+" and "-" keys to set the CPU temperature threshold to between 65° and 90° C. When this threshold is exceeded, the overheat LED on the chassis will light up and an alarm will sound. The LED and alarm will turn off once the CPU temperature has dropped to 5 degrees below the threshold set. The default setting is **78° C**.

The other items in the submenu are all systems monitor displays for the following information:

CPU1 Temperature, CPU2 Temperature (for 2U systems), System Temperature, CPU1 Vcore, CPU2 Vcore (for 2U systems), 3.3V Vcc, +5 Vin, +12Vin, -12V Vcc, DDRA VTT, DDRB VTT, 1.2V for Hyper Transport, DIMM Voltage, 1.8V for chipset, 5V Standby and 3.3V Standby.

## ▶ System Fan Monitor

### Fan Speed Control Modules

This feature allows the user to determine how the system will control the speed of the onboard fans. If the option is set to "3-pin fan", the fan speed is controlled based upon the CPU die temperature. When the CPU die temperature is higher, the fan speed will be higher as well. If the option is set to "4-pin", the fan speed will be controlled by the Thermal Management Settings pre-configured by the user with this setting. Select "3-pin" if your motherboard has 3-pin fan headers. Select "4-pin" if your motherboard has 4-pin fan headers. Select "Workstation" if your system is used as a Workstation. Select "Server" if your system is used as a Server. Select "Disable" to disable the fan speed control function and force the onboard fans to continuously run at full speed (12V). The options are **1) Disable, Full Speed,** 2) 3-pin (Server), 3) 3-pin (Workstation), 4) 4-pin (Server) and 5) 4-pin (Workstation).

### FAN1 Speed through FAN5 Speed

The speeds of the onboard fans (in rpm) are displayed here.

## 7-4 PCI/PnP Menu

### Plug & Play OS

Select Yes to allow the OS to configure Plug & Play devices. (This is not required for system boot if your system has an OS that supports Plug & Play.) Select **No** to allow AMIBIOS to configure all devices in the system.

### PCI Latency Timer

This option sets the latency of all PCI devices on the PCI bus. Select a value to set the PCI latency in PCI clock cycles. Options are 32, **64**, 96, 128, 160, 192, 224 and 248.

### Allocate IRQ to PCI VGA

Set this value to allow or restrict the system from giving the VGA adapter card an interrupt address. The options are **Yes** and No.

### Palette Snooping

Select "Enabled" to inform the PCI devices that an ISA graphics device is installed in the system in order for the graphics card to function properly. The options are Enabled and **Disabled**.

### PCI IDE BusMaster

Set this value to allow or prevent the use of PCI IDE busmastering. Select "Enabled" to allow AMI BIOS to use PCI busmaster for reading and writing to IDE drives. The options are **Disabled** and Enabled.

### Offboard PCI/ISA IDE Card

This option allows the user to assign a PCI slot number to an Off-board PCI/ISA IDE card in order for it to function properly. The options are **Auto**, PCI Slot1, PCI Slot2, PCI Slot3, PCI Slot4, PCI Slot5, and PCI Slot6.

### IRQ3/IRQ4/IRQ5/IRQ7/IRQ9/IRQ10/IRQ11/IRQ14/IRQ15

This feature specifies the availability of an IRQ to be used by a PCI/PnP device. Select Reserved for the IRQ to be used by a Legacy ISA device. The options are **Available** and Reserved.

### DMA Channel 0/Channel 1/Channel 3/Channel 5/Channel 6/Channel 7

Select Available to indicate that a specific DMA channel is available to be used by a PCI/PnP device. Select Reserved if the DMA channel specified is reserved for a Legacy ISA device. The options are **Available** and Reserved.

### Reserved Memory Size

This feature specifies the size of memory block to be reserved for Legacy ISA devices. The options are **Disabled**, 16K, 32K and 64K.

## 7-5 Boot Menu

The Boot menu contains several sub-menus.

### ▶ Boot Settings Configuration

### Quick Boot

If Enabled, this option will skip certain tests during POST to reduce the time needed for the system to boot up. The options are **Enabled** and Disabled.

### Quiet Boot

If **Disabled**, normal POST messages will be displayed on boot-up. If Enabled, this display the OEM logo instead of POST messages.

### Add-On ROM Display Mode

This setting controls the display of add-on ROM (read-only memory) messages. Select "**Force BIOS**" to allow the computer system to force a third party BIOS to display during system boot. Select "Keep Current" to allow the computer system to display the BIOS information during system boot.

### Boot up Num-Lock

Set this to "On" to allow the Number Lock setting to be modified during boot up. The options are **On** and Off.

### PS/2 Mouse Support

This setting is to specify PS/2 mouse support. The options are **Auto**, Enabled and Disabled.

### Wait for 'F1' If Error

Enable to activate the Wait for F1 if Error function. The options are **Enabled** and Disabled.

### Hit 'DEL' Message Display

Enable to display the message telling the user to hit the DEL key to enter the setup utility. The options are **Enabled** and Disabled.

### Interrupt 19 Capture

Enable to allow ROMs to trap Interrupt 19. The options are **Enabled** and Disabled.

## ▶ Boot Device Priority

This feature allows the user to prioritize the sequence for the Boot Device with the devices installed in the system. The default settings (with generic names) are:

- 1st Boot Device – Removeable drive (e.g. floppy drive)
- 2nd Boot Device – CD/DVD
- 3rd Boot Device – Hard drive
- 4th Boot Device – LAN

## ▶ Hard Disk Drives

This feature allows the user to prioritize the Boot sequence from available hard drives.

### 1st Drive/2nd Drive/3rd Drive/4th Drive

Specify the boot sequence for 1st, 2nd, 3rd and 4th hard drives.

## ▶ Removable Drives

This feature allows the user to specify the Boot sequence from available removable drives.

### 1st Drive

Specifies the boot sequence for the 1st Removable Drive. The options are **1st Floppy Drive** and Disabled.

### ▶ CD/DVD Drives

This feature allows the user to specify the boot sequence from available CDROM drives.

#### 1st Drive

Specifies the boot sequence for the 1st Hard Drive.

## 7-6 Security Menu

AMI BIOS provides a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

### Change Supervisor Password

Select this option and press <Enter> to access the sub menu, and then type in the password.

### Change User Password

Select this option and press <Enter> to access the sub menu, and then type in the password.

### Clear User Password

Select this option and press <Enter> to access the sub menu. You can use the sub menu to clear the user password.

### Boot Sector Virus Protection

This option is near the bottom of the Security Setup screen. Select "Disabled" to deactivate the Boot Sector Virus Protection. Select "Enabled" to enable boot sector protection. When "Enabled", AMI BIOS displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The options are Enabled and **Disabled**.

# 7-7 Chipset Menu

## ▶ North Bridge Configuration

### ▶ Memory Configuration

#### Memclock Mode

This setting determines how the memory clock is set. **Auto** has the memory clock set by the code and Limit allows the user to set a standard value.

#### MCT Timing Mode

Sets the timing mode for memory. Options are **Auto** and Manual.

#### User Configuration Mode

Options are **Auto** and Manual.

#### Burst Length

Use this setting to set the memory burst length. 64-bit Dq must use 4 beats. Options are 8 beats, **4 beats** and 2 beats.

#### Enable Clock to All DIMMs

This setting allows the user to enable unused clocks to DIMMs, even if DIMM slots are empty. Options are Enabled and **Disabled**.

#### Software Memory Hole

When "Enabled", allows software memory remapping around the memory hole. Options are **Enabled** and Disabled.

#### Hardware Memory Hole

When "Enabled", allows software memory remapping around the memory hole (only supported by rev. EO processors and above). Options are Enabled and **Disabled**.

## ▶ ECC Configuration

### DRAM ECC Enable

DRAM ECC allows hardware to report and correct memory errors automatically. Options are **Enabled** and Disabled.

#### MCA DRAM ECC Logging

When "Enabled", MCA DRAM ECC logging and reporting is enabled. Options are Enabled and **Disabled**.

#### ECC Chip Kill

Allows the user to Enable or **Disable** ECC Chip Kill.

#### DRAM Scrub Redirect

Allows system to correct DRAM ECC errors immediately, even with background scrubbing on. Options are Enabled and **Disabled**.

#### DRAM BG Scrub

Corrects memory errors so later reads are correct. Options are **Disabled** and various times in nanoseconds and microseconds.

#### L2 Cache BG Scrub

Allows L2 cache RAM to be corrected when idle. Options are **Disabled** and various times in nanoseconds and microseconds.

#### Data Cache BG Scrub

Allows L1 cache RAM to be corrected when idle. Options are **Disabled** and various times in nanoseconds and microseconds.

## ▶ IOMMU Option Menu

### IOMMU Mode

IOMMU is supported on Linux-based systems to convert 32-bit I/O addresses to 64-bit. Options are **Disabled**, Best Fit and Absolute. Selecting the Best Fit or Absolute settings allows the user to select aperture size.

### Memory Timing Parameters

Select which node's timing parameters to display (on the same screen below). Options are **CPU Node 0** and CPU Node1.

## ▶ South Bridge Configuration

### 2.0 SMBus Controller

Allows the user to **Enable** or Disable the SMBus controller.

### HT Link0 P-Comp Mode

Allows user to set values for this mode. Options are **Auto** (hardware compensation values), Data (allows user to override auto values with an absolute value), CalComp + Data (allows user to add to the generated value) and CalComp - Data (allows user to subtract from the generated value).

### HT Link0 N-Comp Mode

Allows user to set values for this mode. Options are **Auto** (hardware compensation values), Data (allows user to override auto values with an absolute value), CalComp + Data (allows user to add to the generated value) and CalComp - Data (allows user to subtract from the generated value).

### HT Link0 RZ-Comp Mode

Allows user to set values for this mode. Options are **Auto** (hardware compensation values), Data (allows user to override auto values with an absolute value), CalComp + Data (allows user to add to the generated value) and CalComp - Data (allows user to subtract from the generated value).

## 7-8 Power Menu

### Power Button Mode

Allows the user to change the function of the power button. Options are **Instant Off** and 4-Sec. Delay.

### Restore on AC Power Loss

This setting allows you to choose how the system will react when power returns after an unexpected loss of power. The options are Power Off, Power On and **Last State**.

### Watch Dog Timer

This setting is used to enable or disabled the Watch Dog Timer function. It must be used in conjunction with the Watch Dog jumper (see Chapter 2 for details). The options are **Disabled** and Enabled.

## 7-9 Exit Menu

Select the Exit tab from AMI BIOS Setup Utility screen to enter the Exit BIOS Setup screen.

### Save Changes and Exit

When you have completed the system configuration changes, select this option to leave BIOS Setup and reboot the computer, so the new system configuration parameters can take effect. Select Save Changes and Exit from the Exit menu and press <Enter>.

### Discard Changes and Exit

Select this option to quit BIOS Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

### Discard Changes

Select this option and press <Enter> to discard all the changes and return to AMI BIOS Utility Program.

### Load Optimal Defaults

To set this feature, select Load Optimal Defaults from the Exit menu and press <Enter>. Then Select "OK" to allow BIOS to automatically load the Optimal Defaults as the BIOS Settings. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications.

### Load Fail-Safe Defaults

To set this feature, select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The Fail-Safe settings are designed for maximum system stability, but not maximum performance.

# Appendix A

# BIOS Error Beep Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

**Non-fatal errors** are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

**Fatal errors** are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list, on the following page, correspond to the number of beeps for the corresponding error. All errors listed, with the exception of Beep Code 8, are fatal errors.

POST codes may be read on the debug LEDs located beside the LAN port on the serverboard backplane. See the description of the Debug LEDs (LED1 and LED2) in Chapter 5.

## A-1 AMIBIOS Error Beep Codes

| Beep Code | Error Message | Description |
|---|---|---|
| 1 beep | Refresh | Circuits have been reset. (Ready to power up.) |
| 5 short, 1 long | Memory error | No memory detected in system |
| 8 beeps | Display memory read/write error | Video adapter missing or with faulty memory |

# Notes

# Appendix B

# BIOS POST Checkpoint Codes

When AMIBIOS performs the Power On Self Test, it writes checkpoint codes to I/O port 0080h. If the computer cannot complete the boot process, diagnostic equipment can be attached to the computer to read I/O port 0080h.

## B-1 Uncompressed Initialization Codes

The uncompressed initialization checkpoint codes are listed in order of execution:

| Checkpoint | Code Description |
|---|---|
| D0h | The NMI is disabled. Power on delay is starting. Next, the initialization code checksum will be verified. |
| D1h | Initializing the DMA controller, performing the keyboard controller BAT test, starting memory refresh and entering 4 GB flat mode next. |
| D3h | Starting memory sizing next. |
| D4h | Returning to real mode. Executing any OEM patches and setting the Stack next. |
| D5h | Passing control to the uncompressed code in shadow RAM at E000:0000h. The initialization code is copied to segment 0 and control will be transferred to segment 0. |

## B-2 Bootblock Recovery Codes

The bootblock recovery checkpoint codes are listed in order of execution:

| Checkpoint | Code Description |
|---|---|
| E0h | The onboard floppy controller if available is initialized. Next, beginning the base 512 KB memory test. |
| E1h | Initializing the interrupt vector table next. |
| E2h | Initializing the DMA and Interrupt controllers next. |
| E6h | Enabling the floppy drive controller and Timer IRQs. Enabling internal cache memory. |
| Edh | Initializing the floppy drive. |
| Eeh | Looking for a floppy diskette in drive A:. Reading the first sector of the diskette. |
| Efh | A read error occurred while reading the floppy drive in drive A:. |
| F0h | Next, searching for the AMIBOOT.ROM file in the root directory. |
| F1h | The AMIBOOT.ROM file is not in the root directory. |
| F2h | Next, reading and analyzing the floppy diskette FAT to find the clusters occupied by the AMIBOOT.ROM file. |
| F3h | Next, reading the AMIBOOT.ROM file, cluster by cluster. |
| F4h | The AMIBOOT.ROM file is not the correct size. |
| F5h | Next, disabling internal cache memory. |
| FBh | Next, detecting the type of flash ROM. |
| FCh | Next, erasing the flash ROM. |
| FDh | Next, programming the flash ROM. |
| FFh | Flash ROM programming was successful. Next, restarting the system BIOS. |

## B-3 Uncompressed Initialization Codes

The following runtime checkpoint codes are listed in order of execution. These codes are uncompressed in F0000h shadow RAM.

| Checkpoint | Code Description |
|---|---|
| 03h | The NMI is disabled. Next, checking for a soft reset or a power on condition. |
| 05h | The BIOS stack has been built. Next, disabling cache memory. |
| 06h | Uncompressing the POST code next. |
| 07h | Next, initializing the CPU and the CPU data area. |
| 08h | The CMOS checksum calculation is done next. |
| 0Ah | The CMOS checksum calculation is done. Initializing the CMOS status register for date and time next. |
| 0Bh | The CMOS status register is initialized. Next, performing any required initialization before the keyboard BAT command is issued. |
| 0Ch | The keyboard controller input buffer is free. Next, issuing the BAT command to the keyboard controller. |
| 0Eh | The keyboard controller BAT command result has been verified. Next, performing any necessary initialization after the keyboard controller BAT command test. |
| 0Fh | The initialization after the keyboard controller BAT command test is done. The keyboard command byte is written next. |
| 10h | The keyboard controller command byte is written. Next, issuing the Pin 23 and 24 blocking and unblocking command. |
| 11h | Next, checking if <End or <Ins> keys were pressed during power on. Initializing CMOS RAM if the Initialize CMOS RAM in every boot AMIBIOS POST option was set in AMIBCP or the <End> key was pressed. |
| 12h | Next, disabling DMA controllers 1 and 2 and interrupt controllers 1 and 2. |
| 13h | The video display has been disabled. Port B has been initialized. Next, initializing the chipset. |
| 14h | The 8254 timer test will begin next. |
| 19h | Next, programming the flash ROM. |
| 1Ah | The memory refresh line is toggling. Checking the 15 second on/off time next. |
| 2Bh | Passing control to the video ROM to perform any required configuration before the video ROM test. |
| 2Ch | All necessary processing before passing control to the video ROM is done. Looking for the video ROM next and passing control to it. |
| 2Dh | The video ROM has returned control to BIOS POST. Performing any required processing after the video ROM had control |
| 23h | Reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors. |
| 24h | The configuration required before interrupt vector initialization has completed. Interrupt vector initialization is about to begin. |

| Checkpoint | Code Description |
|---|---|
| 25h | Interrupt vector initialization is done. Clearing the password if the POST DIAG switch is on. |
| 27h | Any initialization before setting video mode will be done next. |
| 28h | Initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next. |
| 2Ah | Bus initialization system, static, output devices will be done next, if present. See the last page for additional information. |
| 2Eh | Completed post-video ROM test processing. If the EGA/VGA controller is not found, performing the display memory read/write test next. |
| 2Fh | The EGA/VGA controller was not found. The display memory read/write test is about to begin. |
| 30h | The display memory read/write test passed. Look for retrace checking next. |
| 31h | The display memory read/write test or retrace checking failed. Performing the alternate display memory read/write test next. |
| 32h | The alternate display memory read/write test passed. Looking for alternate display retrace checking next. |
| 34h | Video display checking is over. Setting the display mode next. |
| 37h | The display mode is set. Displaying the power on message next. |
| 38h | Initializing the bus input, IPL, general devices next, if present. See the last page of this chapter for additional information. |
| 39h | Displaying bus initialization error messages. See the last page of this chapter for additional information. |
| 3Ah | The new cursor position has been read and saved. Displaying the Hit <DEL> message next. |
| 3Bh | The Hit <DEL> message is displayed. The protected mode memory test is about to start. |
| 40h | Preparing the descriptor tables next. |
| 42h | The descriptor tables are prepared. Entering protected mode for the memory test next. |
| 43h | Entered protected mode. Enabling interrupts for diagnostics mode next. |
| 44h | Interrupts enabled if the diagnostics switch is on. Initializing data to check memory wraparound at 0:0 next. |
| 45h | Data initialized. Checking for memory wraparound at 0:0 and finding the total system memory size next. |
| 46h | The memory wraparound test is done. Memory size calculation has been done. Writing patterns to test memory next. |
| 47h | The memory pattern has been written to extended memory. Writing patterns to the base 640 KB memory next. |
| 48h | Patterns written in base memory. Determining the amount of memory below 1 MB next. |
| 49h | The amount of memory below 1 MB has been found and verified. |
| 4Bh | The amount of memory above 1 MB has been found and verified. Checking for a soft reset and clearing the memory below 1 MB for the soft reset next. If this is a power on situation, going to checkpoint 4Eh next. |

| Checkpoint | Code Description |
|---|---|
| 4Ch | The memory below 1 MB has been cleared via a soft reset. Clearing the memory above 1 MB next. |
| 4Dh | The memory above 1 MB has been cleared via a soft reset. Saving the memory size next. Going to checkpoint 52h next. |
| 4Eh | The memory test started, but not as the result of a soft reset. Displaying the first 64 KB memory size next. |
| 4Fh | The memory size display has started. The display is updated during the memory test. Performing the sequential and random memory test next. |
| 50h | The memory below 1 MB has been tested and initialized. Adjusting the displayed memory size for relocation and shadowing next. |
| 51h | The memory size display was adjusted for relocation and shadowing. |
| 52h | The memory above 1 MB has been tested and initialized. Saving the memory size information next. |
| 53h | The memory size information and the CPU registers are saved. Entering real mode next. |
| 54h | Shutdown was successful. The CPU is in real mode. Disabling the Gate A20 line, parity, and the NMI next. |
| 57h | The A20 address line, parity, and the NMI are disabled. Adjusting the memory size depending on relocation and shadowing next. |
| 58h | The memory size was adjusted for relocation and shadowing. Clearing the Hit <DEL> message next. |
| 59h | The Hit <DEL> message is cleared. The <WAIT...> message is displayed. Starting the DMA and interrupt controller test next. |
| 60h | The DMA page register test passed. Performing the DMA Controller 1 base register test next. |
| 62h | The DMA controller 1 base register test passed. Performing the DMA controller 2 base register test next. |
| 65h | The DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next. |
| 66h | Completed programming DMA controllers 1 and 2. Initializing the 8259 interrupt controller next. |
| 67h | Completed 8259 interrupt controller initialization. |
| 7Fh | Extended NMI source enabling is in progress. |
| 80h | The keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next. |
| 81h | A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next. |
| 82h | The keyboard controller interface test completed. Writing the command byte and initializing the circular buffer next. |
| 83h | The command byte was written and global data initialization has completed. Checking for a locked key next. |
| 84h | Locked key checking is over. Checking for a memory size mismatch with CMOS RAM data next. |
| 85h | The memory size check is done. Displaying a soft error and checking for a password or bypassing WINBIOS Setup next. |

| Checkpoint | Code Description |
|---|---|
| 86h | The password was checked. Performing any required programming before WINBIOS Setup next. |
| 87h | The programming before WINBIOS Setup has completed. Uncompressing the WINBIOS Setup code and executing the AMIBIOS Setup or WINBIOS Setup utility next. |
| 88h | Returned from WINBIOS Setup and cleared the screen. Performing any necessary programming after WINBIOS Setup next. |
| 89h | The programming after WINBIOS Setup has completed. Displaying the power on screen message next. |
| 8Ch | Programming the WINBIOS Setup options next. |
| 8Dh | The WINBIOS Setup options are programmed. Resetting the hard disk controller next. |
| 8Fh | The hard disk controller has been reset. Configuring the floppy drive controller next. |
| 91h | The floppy drive controller has been configured. Configuring the hard disk drive controller next. |
| 95h | Initializing the bus option ROMs from C800 next. See the last page of this chapter for additional information. |
| 96h | Initializing before passing control to the adaptor ROM at C800. |
| 97h | Initialization before the C800 adaptor ROM gains control has completed. The adaptor ROM check is next. |
| 98h | The adaptor ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM returned control. |
| 99h | Any initialization required after the option ROM test has completed. Configuring the timer data area and printer base address next. |
| 9Ah | Set the timer and printer base addresses. Setting the RS-232 base address next. |
| 9Bh | Returned after setting the RS-232 base address. Performing any required initialization before the Coprocessor test next. |
| 9Ch | Required initialization before the Coprocessor test is over. Initializing the Coprocessor next. |
| 9Dh | Coprocessor initialized. Performing any required initialization after the Coprocessor test next. |
| 9Eh | Initialization after the Coprocessor test is complete. Checking the extended keyboard, keyboard ID, and Num Lock key next. Issuing the keyboard ID command next. |
| A2h | Displaying any soft errors next. |
| A3h | The soft error display has completed. Setting the keyboard typematic rate next. |
| A4h | The keyboard typematic rate is set. Programming the memory wait states next. |
| A5h | Memory wait state programming is over. Clearing the screen and enabling parity and the NMI next. |
| A7h | NMI and parity enabled. Performing any initialization required before passing control to the adaptor ROM at E000 next. |
| A8h | Initialization before passing control to the adaptor ROM at E000h completed. Passing control to the adaptor ROM at E000h next. |

| Checkpoint | Code Description |
|---|---|
| A9h | Returned from adaptor ROM at E000h control. Performing any initialization required after the E000 option ROM had control next. |
| Aah | Initialization after E000 option ROM control has completed. Displaying the system configuration next. |
| Abh | Uncompressing the DMI data and executing DMI POST initialization next. |
| B0h | The system configuration is displayed. |
| B1h | Copying any code to specific areas. |
| 00h | Code copying to specific areas is done. Passing control to INT 19h boot loader next. |

# Notes

# Appendix C

# System Specifications

### Processors
Single or dual AMD Opteron™ 200 Series 64-bit processors in to 940-pin micro PGA ZIF sockets

### Chipset
AMD 8132/8111 chipset

### BIOS
4 Mb AMIBIOS® Flash ROM

### Memory Capacity
Eight 184-pin DIMM sockets supporting up to 32 GB of registered ECC DDR266 or up to 16 GB of registered ECC DDR400/333 SDRAM

**Note: Both interleaved and non-interleaved memory supported. Memory capacity is halved when using a single processor. See the memory section in Chapter 5 for details.**

### Serial ATA Controller
Marvell 88SX6041 for 4-port Serial ATA (RAID 0, 1 supported)

### Serial ATA Backplane
One (1) CSE-SATA-813L 1U SATA backplane

### Serial ATA Drive Bays
Four (4) drive bays to house four (4) standard Serial ATA drives

### Peripheral Drive Bays
One (1) slim 3.5" floppy drive
One (1) slim CD-ROM drive

### Expansion Slots (provided with included riser cards)
Two (2) 64-bit 133 MHz PCI-X slots
One (1) full-height, half-length riser card (CSE-RR1U-X) and one (1) low profile riser card (CSE-RR1U-XLP)

### Serverboard
Model: H8DAR-T
Form Factor: Extended ATX
Dimensions: 12 x 13.05 in (305 x 332 mm)

### Chassis
Model: SC813T+-500
Form Factor: 1U rackmount
Dimensions: (WxHxD) 17.2 x 1.7 x 25.6 in. (437 x 44 x 650 mm)

### Weight
Gross (Bare Bone): 38 lbs. (17.3 kg.)

### System Cooling
Four (4) counter-rotating 4-cm fans
One (1) air shroud

### System Input Requirements
AC Input Voltage: 100-240V AC auto-range
Rated Input Current: 10A (115V) to 5A (230V)
Rated Input Frequency: 50 to 60 Hz

### Power Supply
Rated Output Power: 500W (Model# SP502-1S, Part# PWS-048)
Rated Output Voltages: +3.3V (21A), +5V (30A), +12V (39A), -12V (1A), +5Vsb (2A)

### BTU Rating
2750 BTUs/hr (for rated output power of 500W)

### Operating Environment
Operating Temperature: 10º to 35º C (50º to 95º F)
Non-operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 8% to 90% (non-condensing)
Non-operating Relative Humidity: 5 to 95% (non-condensing)

## Regulatory Compliance

Electromagnetic Emissions:
FCC Class B, EN 55022 Class B, EN 61000-3-2/-3-3, CISPR 22 Class B

Electromagnetic Immunity:
EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4,
EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety:
EN 60950/IEC 60950-Compliant, UL Listed (USA), CUL Listed (Canada), TUV Certified (Germany), CE Marking (Europe)

# Notes